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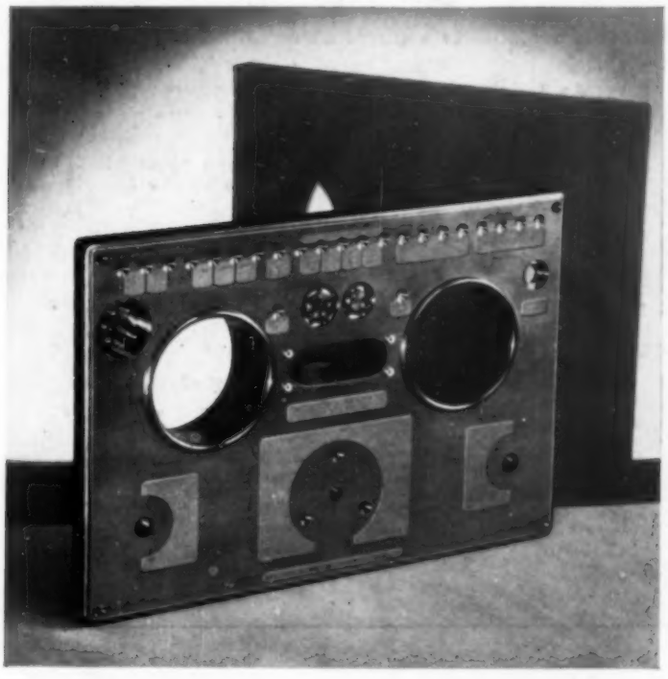
PLASTICS & MOLDED PRODUCTS

Volume 7 SEPTEMBER 1931 Number 9



Bakelite Molded panel used on the Radio Set Analyzer made by Jewell Electric Company, Chicago, Ill.

Intricate panels readily formed

from attractive Bakelite Molded

An exceptionally fine example of molding is presented by the panel used on the Jewell radio set analyzer. It is formed in one operation from lustrous black Bakelite Molded with many firmly embedded metal inserts, cleanly and accurately formed threads and clearly impressed letters and numerals. The accuracy of the dimensions of this panel save time and cost in the insertion of instruments and knobs. The attractiveness of its design and finish add to the salability of the entire device.

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THE MATERIAL OF A THOUSAND USES

SAMUEL KINSLEY
CERTIFIED PUBLIC ACCOUNTANT
NEW YORK CITY

N.Y. July 7, 1931.

Plastics Publications,Inc.,
114 East 32nd St.,
New York City.

Gentlemen:

In accordance with your instructions, I have made an examination of all inquiries handled by mail in your office during the period, from June 30, 1928 to July 1, 1931. From these I have prepared three schedules setting forth, in detail, the number of inquiries received, the companies or individuals to whom these inquiries were referred, and a summary showing number of answers received to a questionnaire mailed to subscribers.

Schedule I - shows that your corporation received 751 inquiries on 196 classifications of materials, equipment, molding and manufacturing service.

Schedule II - shows that your corporation received 701 inquiries which you referred to 253 companies active in the plastic industry.

Schedule III - shows in detail the answers received by your corporation in the 157 questionnaires returned to you from 2749 mailed to subscribers.

I hereby certify that the attached reports were compiled from the files of Plastics Publications, Inc., and in my opinion represent correctly the details contained therein.

Respectfully submitted,

Samuel Kinsley
Certified Public Accountant
New York

KB:SK

This report is now made available for inspection to prospective clients and their agencies. It may be reviewed at our New York office 114 E. 32nd Street, or, by request, at your office.

• • • • •

"IF you have any rule, or any fixed attitude, toward new media — throw it away. Open your mind and catch up with the parade—or the parade will go tearing past you.

Open your mind to the idea of being one of the first to use such media, as they develop. If you're going to be a leader, lead!"

From *Aesop Glim* in *Printers Ink Monthly*, September, 1930.

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PLASTICS & MOLDED PRODUCTS

Reg. U. S. Pat. Off.

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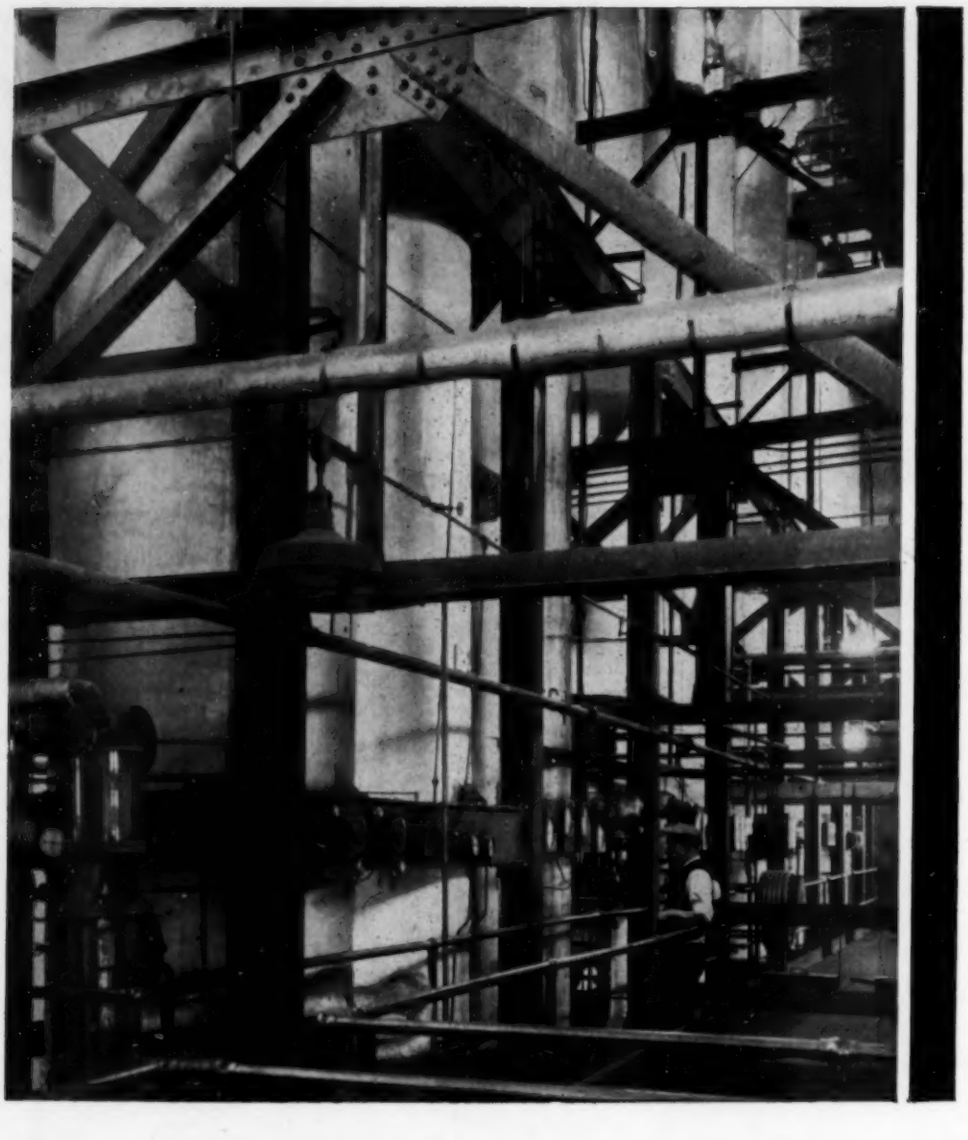

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PLASTICS & MOLDED PRODUCTS

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Volume 7 SEPTEMBER, 1931 Number 9

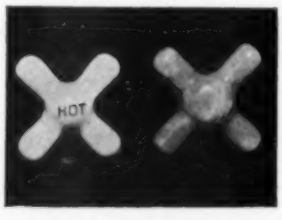
NO one any longer questions the presence of a business depression but it is heartening to see a live interest in new plastic materials in the midst of this one. Some of the letters which came to the editor requesting further information about Sakaloid, described in our August issue, referred to possible applications of startling significance—and from companies of importance. Prophecies of the future growth of the industry must include the potentialities of sugar plastics.

• • •

While we concede that it is still impractical to silence dollar watches with resinoid gears, such is not the case with motion picture projectors. The Ampro motion picture projector utilizes Bakelite material for "insulation properties, high dielectric values, mechanical efficiency, and quiet operation". Specifically, the applications include lamp housing, switches, speed control button — all of the molded Bakelite material — and a train of five gears in the mechanism itself.

•

Cast phenolic resinoids have properties other than ability to simulate natural stones. Imperviousness to hot water is one that recommends it for faucet handles. Material used in these is Crystillin.



•

Durez again rides on the dashboard, this time as a handy clamp-on ash receiver. A flick of the finger raises the hinged cover, and

after the ashes have been dropped in, another flick snaps it down.

•

This powder box by Celluloid Corp. is a de luxe accessory suitable for a lady's dressing table. A deep, lush, onyx contrasts with jet black bars and a metallized knob serves as a handle.

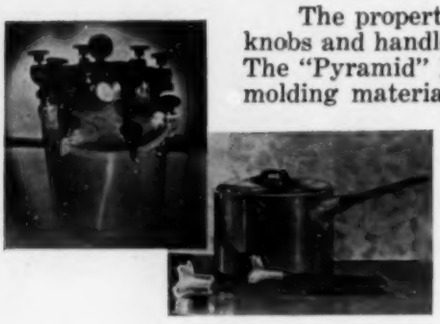
•

There is always something new under the sun and molded plastics play an important role in this application. General Plastics, Inc., presents the Debutante Razor, a British innovation, designed especially for use by the female of the species. Base, cover and razor-handle are all molded. The shaving edge consists of a round, washer-like blade which fits into the round guard, removing all danger from sharp corners.

We understand that American rights for manufacturing and distributing are being offered and hope that the washer-like blade does not mar the smile on the gentleman's face that ornaments most razor blade packages sold the world over.

A topic frequently discussed by buyers of molded products and their custom molders is the adaptability of the extrusion process to their particular needs. Chief advantage in this is reduced mold cost, which is often a deterent to the adoption of synthetic plastic parts. Extrudable plastics and suitable equipment—both prime considerations—are approaching improved development and production of extruded parts should soon be an every day affair.

• • •



The properties of molded resinoid have long recommended this material for knobs and handles on cooking utensils. These two applications are worthy of note. The "Pyramid" Brand Saucepan has a new patented handle. Made in Bakelite molding material by The Witton Moulded Insulation Works, Birmingham. (Proprietors: The General Electric Company, Ltd.) for Messrs. Hague & McKenzie Ltd., Birmingham. Illustration shows the steel core which is covered with Bakelite material.

The trend to Bakelite knobs and handles on aluminum cooking utensils is advancing rapidly. One good example is this special twelve quart Liberty Steam Pressure Cooker, manufactured by the Kewaskum Aluminum Company.

• • •

A companion to the powder box shown on the preceding page is this large-sized compact, also made by the Celluloid Corporation. It is intended to carry loose powder. A transparent pyroxylin shell keeps the powder from contact with the bottom inside the container. Another transparent disk, fitted with a small black knob, keeps the puff clean. The cover, with a catch to prevent accidental opening, has a mirror inside. The compact shown is made of onyx Amerith.

• • •

Dormeyer electric food mixer uses Bakelite molded handles in the form already well established in the percolator field. Strength and appearance are the two chief factors which the new material offers over wood formerly employed.

• • •

Anent the interest in new materials mentioned on the previous page, we venture to state that this is not all that may be expected to burst on the plastics firmament. We see other new materials having *different* properties about to make their debut, but no letters will be answered until the sponsoring companies make official announcements.

• • •

In the application of plastics to closures, sometimes it is the material in the bottles which claims distinction, sometimes the bottle, and frequently the closure itself. A Durez cap on the world's most unique package. The bottle on the right has a concave side, specially treated, in which one rubs his razor blade to hone and sharpen it. The bottle contains a shaving lotion. Specially-made black Durez caps are used on all the items in the Fitch line.

A new Durez cap-and-applicator unit, totally different from ordinary devices of its kind, is used on the new Instant Odorono bottles. Sponge rubber for the dauber, hard rubber for the rod, and black Durez for the screw-cap itself, are the materials used. Allen & Hills, Inc., Auburn, N. Y. are the molders of this ingenious arrangement.

• • •

THE dearth of applications of molded products of urea-formaldehyde resinoids and cellulose acetate materials on these pages is not to be taken as a mark of unfavorable prejudice. We have been promised several for early release. However, we have seen a bell-type shade for wall lights that was quite pretty. Molded in white Plaskon.

"For the Time of Your Life" AICO Clock Has a Molded Case

By Benn C. Budd

American Insulator Corp.

WALK into almost any good department store's electric clock department and you will see displayed a new electric clock which has already established records for saleability.

You may be surprised at the attention-getting appeal of such a small article. A glance at the store's sales figures will be even a greater surprise. More than one person has asked us how we "hit upon" the idea of producing the AICO clock.

The design, marketing plan and production of the AICO clock has been a rather cold-blooded affair. As a matter of fact, the most tangible kind of evidence was thoroughly analyzed before a move was made.

For instance, our Merchandising and Marketing Research Division compiled complete figures on the potentialities of the electric clock market. Charts showed clearly that there was a considerable field for a *good* electric clock to sell for from five to six dollars.

A New Market Found

Further surveys and studies indicated a market for a small, attractively designed clock in colors. This field was non-competitive and did not conflict with already established lines of kitchen clocks—large wood-encased clocks—small mahogany or walnut clocks—clocks with molded cases of Durez or Bakelite.

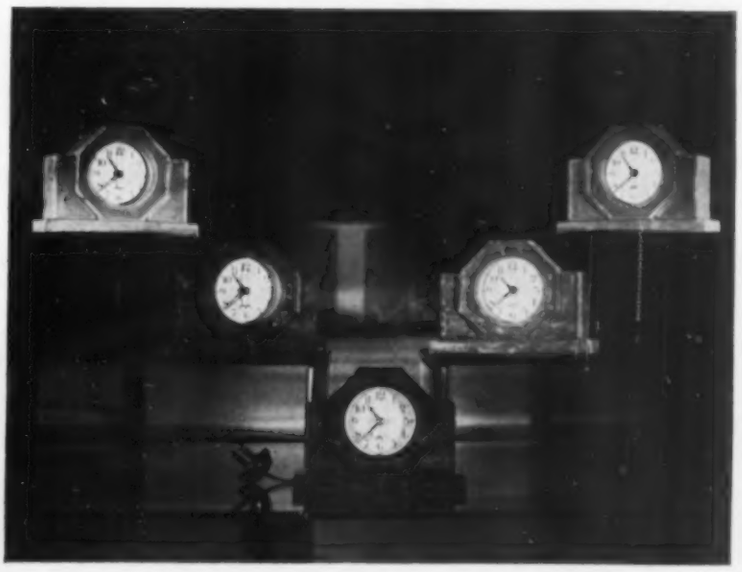
With these very definite facts before us we utilized the services of one of the foremost designers in America—a man who has an outstanding record for designing products which sell because they appeal.

After a thorough test of the final design, molds were produced and a number of cases produced from sixteen different Lumarith colors. These colors were checked and the color range narrowed down to six which now constitute the standard line.

The matter of color is an important one and we have established a system of analyzing color trends and thus keeping abreast of the times on color preferences. We have found local variations in the matter and are now in a position to render an exceptional service to our regular molded products customers who may wish to know what colors will sell best in any given territory. Our data on the color question is kept up-to-date and is, I believe, the only source of such information available dealing with colorful molded products.

At a time when most electric clock manufacturers were endeavoring to cheapen their product to meet the price of some clocks sold through low-priced chain stores we had before us a very clear conception of what the best market in America—the great middle class group—really wanted. We knew the type of merchandise they would buy—the price they were willing to pay—and the place they would look for such merchandise.

For over a year we have heard and read a lot about the future trend of the molding industry and particularly the adaptability of the new colorful molding material Lumarith and its ability to increase sales. We are in a period when sales are of greater importance than ever. The answer to most problems created by depression can be found in two words—"in-



AICO's Lumarith cased electric clocks find a new market. They form a class of merchandise distinct from enameled kitchen clocks, wooden mantel clocks or even the more recent molded resinoid encased timepieces.

creased sales". Certainly unemployment, wage cuts, passed dividends, can all be cured by increased sales at a fair profit.

That Lumarith has an unusual power to stimulate sales was demonstrated when the AICO clock was introduced last July. Hot weather, uncertain business conditions, pre-inventory time, all were negative factors sufficient to absolutely stop the introduction of a new item unless that item had unusual and obvious saleability. The AICO clock met with considerable success even under these handicaps. Many of the finest department stores in the larger cities—such stores for instance as Lord & Taylor, Arnold-Constable and Bloomingdale, New York; Gimble Bros., Philadelphia and Milwaukee; L. S. Ayers & Co. Indianapolis; Wm. F. Gable, Altoona; Younker Bros., Des Moines; N. Snellenburg Co., Philadelphia and many others, placed orders after seeing the clock.

"AICO Clocks for the *Time* of your Life" is the slogan for our clocks. And perfecting a new product and its new plan of distribution in face of almost insurmountable obstacles has been a job which has given our plant, our merchandising division and our sales force "the time of their lives."

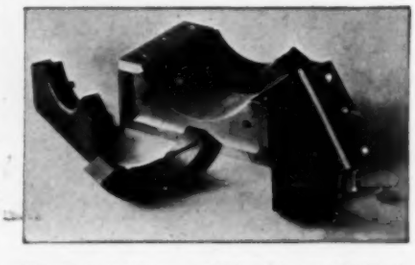
The close coordination of all these factors working together on a common ground of facts has resulted in a success of no mean proportions. And perhaps the most interesting single feature of our entry into the electric clock field has been the information secured by our sales force in their close contact with a new type of buyer—the department store buyer. These buyers, as well as department store merchandise managers, have shown considerable interest in molded products, have offered suggestions regarding colors and design, and have also shown a desire to learn more about other merchandise items which could be molded.

Improved Roll Neck Bearings Made of Laminated Resinoid

By W. E. Brindley
Westinghouse Electric & Mfg. Co.

MICARTA, a phenolic resinous material of extreme strength manufactured by Westinghouse, has given exceptional service as a bearing liner in wire, rod, bar and merchant mills. Representative installations, where the pressures are not excessive and the peripheral speeds vary from 100 to 1000 feet per minute, have shown this material to be superior to any other plain type bearing for roll neck service.

Water alone is used as a lubricant without any change in the conventional cooling system. Impure water, containing weak acids and alkalis, has no effect on Micarta and may be used without damage to the bearing. Seizing and grabbing, so common to other types of non-metallic bearings, is eliminated due to the non-absorbing and non-warping qualities of Micarta. In addition, the peculiar characteristics of the bearing material reduces scoring to a minimum. Particles of sand, grit and scale coming in contact with the surface of the bearing will imbed themselves and cause only the slightest scratching. This is due to the relatively low Brinnell hardness of the material which permits charging and eliminates scoring. Micarta bearings have a slight resilience that enables them to withstand shocks and blows that damage and fatigue ordinary alloy liners.



Exploded View of Micarta Roll Neck Bearing

The three essential parts of the bearing are composed of radial segments, thrust block, and housing. The radial segments usually are 120° pieces so constructed that the wear at any point is at right angles to the grain of the material. The thrust block consists of a separate piece of Micarta so mounted that maximum life is afforded since the edge of the roll rubs against the grain. The thrust block and radial segments are assembled in a machined housing and are held tightly in place. The thrust collar is prevented from turning by a recess machined in the metal housing. Either the thrust collar or radial segments may be replaced independently without any special machine setup. Distribution channels are machined in the bearing surface in order that proper cooling and lubrication are afforded. A typical bearing assembly with component parts is illustrated in the photographs.

Savings in power due to the low coefficient of friction and polishing effect of the material amount to as much as 30%. Additional savings are realized by the elimination of grease and oil, reduced roll maintenance and ease of replacement of either segment or thrust parts.

Micarta Roll Neck Bearing

Farm Wastes and Plastic Products

An informal discussion of possibilities and actualities with some comments on diverse phases of "What is news" in this field

By Carl Marx
Editor, PLASTICS

At the recently concluded Chemical Exposition, the writer expressed himself rather freely on the subject of the future of plastics. Taking the risk of being criticized, he herewith presents some views that may (or again may not) be in accord with those of others. If they provoke comment of either kind it will be equally welcome.

DURING the past three or four years much interest has been attached to products made from cornstalks, corncobs and similar farm waste. It was variously reported that startlingly new products were to be forthcoming, and some companies were formed to exploit the newer processes, such as the making of cornstalk paper, cornstalk board and plastic products. As usual, the apparently unavoidable secrecy surrounded what was actually being done, though most extensive publicity was given to the fact that things were "being done," but without saying how. Only within the past six months have actual patents issued that now reveal that most of the loudly proclaimed startling novelties were in effect nothing more than the adaption of time-honored reactions to old products, with such minor modifications as the particular raw material had of course made necessary.

Novelty or Evolution?

We do not wish to be understood as in any way belittling the real accomplishments of those that have developed workable processes, but we deplore the loud publicity that was given to the work by the daily press, which, quite uninformed on subjects chemical and technical, is only too prone to over-emphasize and to proclaim as epochal every small advance of chemical science. For those of us who are closer to the progress of the plastic art, these processes, when once revealed for what they are, are commonplace and but the logical development of the fundamental concepts of resinification. In other words, what happens during the heralded "marvelous new" reactions, can readily be deduced when one understands the nature of the raw materials that are employed in the processes.

Farm "Relief"

We have heard much of the new products and processes that were to help the farmer to overcome his troubles by supplying him with a ready market for his waste. But when one realizes that these products, before they can possibly make even an infinitesimal dent in the enormous supply of raw materials, require economic research in marketing, and must undergo the stringent test of everyday use, it will easily be understood that many years must elapse before the demand for these products will be any effectual factor in providing a sizeable outlet for these wastes.

Of course these things are interesting. They point the way to what can be done, and lay the foundation for further research into the future. As the writer has often said, the future development of the art of "plastics" will have to be along the lines now being laid down; and will have to eventuate in a structurally strong, very cheap, and readily available raw material; something so inexpensive that it may compete on a price basis alone with natural products such as wood, and the cheaper raw materials such as steel, iron and other metals and alloys. Not until that day is reached will "plastics" really "come into their own."

We predict, rather confidently, that we are just approaching this era. The next ten or fifteen years will write the story —and it will be history!

Corncobs, Oat Hulls and Furfural

The first really worthwhile advance was the commercial development of furfural from such waste as oat hulls and corncobs, particularly the former. This aldehyde is now manufactured and sold in tank-car lots, and at a price that would make it a most attractive raw material for plastic engineers. Its wide application, at the present at least, is however successfully prevented by a strong patent monopoly. The holders of the basic patents on the furfural resins are making a limited use thereof, but we believe that were they to license others, on a reasonable basis, they would in the end make a good deal more money than they will by keeping them strictly to themselves; which of course is their rightful privilege, and strictly within the scope and intent of the monopoly given to a patentee. For many uses, especially

where light colors are not an essential, but where good flow during molding and structural strength are a factor, the furfural resins and molding powders and compounds will play a most important part in the plastics art of the future.

A Natural Development

When once it was understood that furfural could be obtained from materials containing pentosans, by treating them with acid-reacting substances, the thought quite naturally came to many that it would be a comparatively simple matter to form the furfural and to combine it with a phenol right when it was formed; i. e. when it was in what the chemist calls the status nascendi. Evidence of this fact is found in a number of patents that have issued within the past year or so. We had long awaited the appearance of some of these, being apprised of the work that was going on, but prevented from saying anything about it because we had no desire to give premature publicity to those who were devoting their time to research along these lines. But when once they let the patents issue, then the matter is one of public knowledge. It becomes news. And as such we print it. That is what a technical and trade journal such as ours is for. We are aware that we have occasionally been criticised for our attitude; and have been told to "lay off" giving publicity to issued patents. Having courteously refrained from publishing what we were told, and believed to be, "trade secrets", we feel that this criticism is not well taken.

Dr. Sweeny's Work

We have just come across two patents right in the field of which we are speaking. They are those of Dr. Orland R. Sweeny, of the Iowa State College of Agriculture and Mechanic Arts, at Ames, Iowa. We wish to point out right here and now that Dr. Sweeny has done the highly ethical thing—he has assigned them to the College for the furtherance of more research along these lines. This is very commendable. A similar thing was done a few years ago when the inventor of the method of increasing the vitamin-content of food stuffs by irradiation with ultra-violet light, Professor Steenbock, similarly assigned his patents to the University of Wisconsin. The license fees collected from users of this irradiation process were applied to research.

At this point we discuss the pentosan resins developed and patented by Dr. Orland R. Sweeny.

The two Sweeny patents relate to processes for making moldable phenolic pentosan materials, from such raw materials as corncobs, oat hulls, cornstalks, etc. by mixing these substances with an acid and a phenol or cresol, and heating. While the patents state that it is "not thought that furfural enters into the reaction as an intermediate step", this is, at the present time, an undetermined fact. It is known that acids and heat will turn pentosans into furfural, and why this should not happen in this process is hard to see.

Pentosan Resins

The two patents in question are U. S. P. 1,797,559, and 1,797,593, both issued on March 24, 1931; one with the higher number being based on a divisional application of the former, which was filed June 16, 1924. Each patent has but a single claim, in which the proportions of the materials form a limitation. The exact amounts of acid, the temperature and even the time is claimed. The only difference between the two patents is that in the first one hydrochloric acid is used, while in the second one sulfur monochloride is used. The process is described as follows:—

A definite quantity of corncobs, or other pentosan containing material, is reduced to sizes that will pass through a quarter inch mesh screen. It is then thoroughly mixed with sixty percent of its weight of "crude cresylic acid" (cresol) and ten percent of their weight of hydrochloric acid (sp. gr. 1.18). The vessel in which these ingredients are contained is then covered and subjected to a heat of approximately 100° C. for three hours, at the end of which time it is formed into a black, sticky, tacky mass.

This mass is allowed to cool and age. After approximately forty-eight hours it is quite brittle and may then be ground into a fine powder. The resulting powder is then placed in moulds either at normal temperatures or it may be previously heated, and heat may if desired be applied to the moulds after the material is placed therein. The material is subjected to pressure while in the mould. The resultant articles are baked at a temperature under 100° C. for several days, gradually forming a hard insoluble body, having a black lustre. The articles thus produced are non-conductors of electricity.

These articles may be used commercially without the baking process, but unless baked they have a slight tendency to break down in water. The baking process, however, makes them insoluble in water.

The action of the acid element is thought to be catalytic in its nature and causes the pentosan, or possibly its decomposition products, and the phenol to combine chemically into the plastic material. The application of heat during the practice of the process simply accelerates the chemical combination of the pentosan and the phenol.

Some of the pentosan containing materials which have successfully been employed in the production of the improved moldable composition are corncobs, oat hulls, corn stalks, cotton seed hulls and peanut hulls. However, any other materials which contain pentosan may be

(*Continued on page 515*)

Mycalex---An Inorganic Molding Material With Unique Properties*

By Lawrence E. Barringer

Engineer of Insulation, General Electric Company

ENDEAVORS to make use of industrial waste materials often succeed technically but fail economically; *i.e.*, the chemist finds that such materials can be converted into useful products but only at a cost which is prohibitive.

In other cases, investigators succeed both technically and economicaly in using waste material but the total amount of the waste required for the new product proves relatively very small.

Mycalex is a product successfully using waste material, but without either the very low material cost ordinarily expected from waste utilization or the consumption of any considerable proportion of the total waste material left by industrial operations. Nevertheless it has proved a highly useful material in the field of electrical insulation because of its insulating value, its physical properties, and the fact that, in spite of its relatively high cost for materials, it admits of designs which can be produced at substantially lower costs than with materials previously available.

Some fifteen years ago a young English chemist working in India in behalf of London mica interests became interested in the possibility of finding a use for the great quantities of scrap or waste mica left after preparing for the market the well-known white mica of India.

The "mica dump" of refuse mica is characteristic of all mica mines, since only a relatively small percentage of the mica rock taken from the mines is of commercial value. Furthermore, there is again a large percentage of scrap remaining from splitting, trimming, and cutting operations, and this secondary scrap is of course even more attractive for utilization than the mine scrap.

This chemist, Percy B. Crossley, conceived the idea of mixing ground mica scrap with an easily fusible glass, in powder form, heating briquettes of such a mixture to a temperature sufficient to soften the glass particles (about 675 deg. C.) and then molding the mass under hydraulic pressure while still hot and plastic.

First Attempts

With crude apparatus and unskilled Indian labor, Crossley produced plates of stone-like material up to 8½ in. by 11½ in. and in thicknesses up to ¾ in. These plates gave a clear, bell-like tone when struck with a piece of metal, thus indicating at once their comparative hardness and density. Crossley made tests which indicated that his material possessed to a high degree both mechanical strength and effectiveness as an electrical insulating material.

The combination of ground mica and soft glass was named "Mycalex" and duly covered by letters patent. [1]

For his original composition Crossley used lead borate as the readily fusible vitreous binder and scrap white India mica ground to about 60-mesh fineness. The proportions were about one part by weight of ground lead borate to two parts of crushed mica. It was found that in the heating operation prior to molding the lead borate dissolved a slight amount of the mica, assuming a lead borosilicate nature and thus attaining a higher degree of insolubility and infusibility.

In December, 1921, the inventor, Mr. Crossley, visited the General Electric Company at Schenectady and for several months there worked in conjunction with chemists and engineers to determine the further possibilities of his material and the proper production technique to give the desired results.

This development work was continued by General Electric engineers after Mr. Crossley's visit and several years were spent in developing a practical manufacturing technique, determining definitely the properties of the material by careful tests and investigating prospective advantageous utilizations.

Although this is the day of plastics, and synthetic resin compositions have both greatly expanded and filled the field of usefulness of molded products in electrical and mechanical applications, Mycalex has found a place of its own and contributes properties unique among molded materials.

In the first place, Mycalex *is entirely inorganic* and hence not subject to carbonization, burning, softening, blistering, shrinkage and other effects of subjecting organic plastics to overheating, particularly that produced by arcing.

There are inorganic insulations of long standing which are highly heat resistant, such as

*Reprinted, with permission from General Electric Review, July, 1931.

(1) U. S. Patent Re- 15-727, Crossley.

those using asbestos with an inorganic binder, as Portland cement, magnesium hydrate, calcium silicate, etc., but these products are porous and for adequate insulation value require filling which is of necessity carried out with liquid or easily liquefied organic materials, as oils, waxes, or asphalts. These organic treating or filling compounds of course render the treated inorganic material vulnerable to the harmful and destructive effects of high temperatures.

Fillers Unnecessary

Being vitreous, and impervious to both liquids and gases, Mycalex requires no filling with readily destructible organic substances. Mycalex provides the advantage of an impervious ceramic material with which metal members may be combined in the molding operation to produce compact, strong assemblies. Heretofore it has not been practical to mold metal parts in place as component parts of vitreous and impervious ceramic or inorganic materials.

Another advantage of the heat resistance of Mycalex is that aluminum or low-melting alloys may be cast around it without injury. By this procedure, metal fittings may be cast in place or Mycalex parts fastened to fittings by pouring molten metal in the joint.

There are practically no ceramic products which can readily be machined, beyond the grinding operations employed to fit together stoneware, porcelain, and glass articles. Mycalex can readily be machined and finished by the usual operations of turning, sawing, drilling, tapping, filing and polishing. With Carboloy tools, machining becomes relatively very easy.

Still another advantage of Mycalex compared to modern molding materials is its relatively low dielectric power loss measured at high frequencies, rendering the material of particular value to radio applications.

Here, then, is an impervious, heat-resistant, inorganic material with which metal members may be combined in molding or subsequent casting, which is machinable and which possesses unusual insulation value, especially at radio frequencies. In addition, Mycalex possesses high compressive strength, high transverse strength, and resiliency.

The accompanying tabulation (Table I) summarizes the properties of Mycalex in comparison with wet-process porcelain and fused quartz.

In this tabulation Mycalex compares favorably with outstanding vitreous, inorganic insulations as to properties of the materials themselves. It must be remembered that metal parts cannot be combined with either porcelain or quartz during manufacture and that there are other advantages of Mycalex in production technique.

The chief and probably only handicaps to a more universal use of Mycalex have been the lack of a smooth, pleasing sur-

TABLE I

COMPARATIVE PROPERTIES OF MYCALEX, WET-PROCESS PORCELAIN AND FUSED QUARTZ

Property	Mycalex	Wet-process Porcelain	Transparent Fused Quartz
Tensile Strength (Lb. per sq. in.)	8000	6000	8000
Transverse Strength (Modulus of Rupture)	18,000	11,000	.....
Compressive Strength (Lb. per sq. in.)	25,000	55,000	200,000
Resistance to Impact (Ft.-lb.) Area of Section=0.25 sq. in.	0.45	0.36	.....
Water Absorption (Per cent in 24 hr.)	Less than 0.5	Nil	Nil
Dielectric Strength at 25 deg. C. (Volts per mil). Thickness=0.5 in.	245	145	200
Resistivity at 25 deg. C. (Ohms per cm. cube)	5×10^{13}	1×10^{14}	Greater than 1×10^{18}
Power-factor at 100,000 cycles	0.002	0.008	0.0002
Dielectric Constant (K) at 100,000 cycles	8	7.0	4.2
Loss Factor (p-f. $\times$ K)	0.016	0.056	00.00084
Coefficient of Expansion per deg. C.	8×10^{-6}	4×10^{-6}	0.5×10^{-6}
Specific Gravity	3.3	2.442	2.2

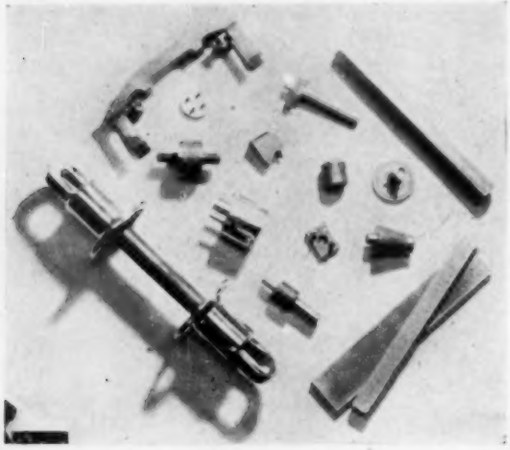


Fig. 1. A group of Mycalex parts and fittings.

Fig. 2. Base for Pliotron tube with metallic parts inserted in place during molding operation.

face as molded and the supposedly high cost, due to the price of the mixture before molding.

Too often, however, users of molded material consider alternative materials upon the basis of a direct substitution in given designs *without* consideration of a redesign adapted to the properties of the proposed material.

Pound for pound or volume for volume in a fixed design Mycalex is not likely to often prove economical, but because of superior properties does permit of profitable redesigning, resulting in cost reductions of from 25 to 70 per cent, as indicated by actual applications of the past few years.

Among the early utilizations of Mycalex were those for antenna insulators and for 250-watt Pliotron tube bases.

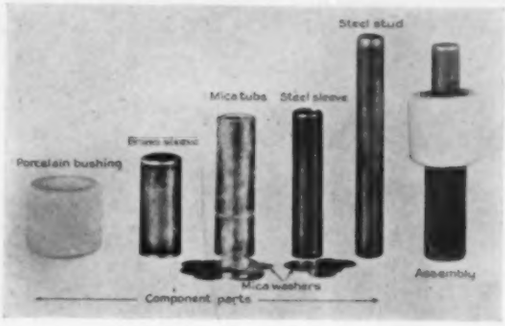
Reductions in Sizes

In using Mycalex for antenna insulators formerly consisting of wooden sticks or rods it was found possible to reduce the length from approximately forty inches to seventeen inches or less and to secure a more rigid and stronger assembly with the end fittings by cementing these fittings in place with molten alloy.

In Pliotron tube bases, several separate porcelain and metal parts were replaced with a single Mycalex molding containing four firmly embedded metal components, as shown in Fig. 2. With the new Mycalex construction the tube cost was reduced. By thus redesigning this base to use Mycalex there were secured (a) a material of higher dielectric strength, (b) a more impervious and dependable insulation, (c) a stronger assembly of the insulation with contiguous metal parts and (d) a reduced tube cost. On the other hand, to simply have replaced the original porcelain part with Mycalex would have led to a cost increase and to no advantage in the tightness and rigidity of construction.

A number of equally advantageous applications of Mycalex to radio apparatus have been given by W. W. Brown in a paper on this particular subject. (2)

Fig. 3. The component parts of a brush holder indicating the considerable number of individual pieces which make up the final assembly.



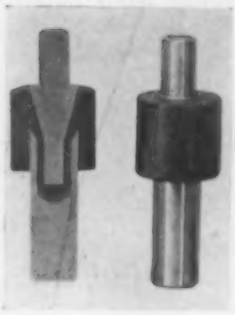


Fig. 4. Only three pieces are used in the redesigned Mycalex brush holder.

One of the best illustrations of gaining the full advantage of Mycalex by changing the design to make use of the unique properties of Mycalex is that of brush-holder studs for motors.

It had been the practice to construct these studs from eight component parts, here listed in approximate order of assembly:

(1). Screw machine stud
(2). Punched steel sleeve
(3). Mica washers
(4). Molded mica sleeve
(5). Mica washers
(6). Punched brass sleeve
(7). Wrapping of adhesive tape
(8). Porcelain bushing

These parts are shown separately in Fig. 3.

With consideration of the high dielectric and mechanical strength of Mycalex and especially of the opportunity for joining metal and insulating parts during the molding operation, a new design was adopted consisting merely of one molding embodying two metal members securely and permanently fixed in place with Mycalex insulation between, as shown in Fig. 4.

The redesigned Mycalex brush-holder stud was manufactured at a cost reduction of thirty-five per cent. In another instance, a seven-member stud was replaced with a unit Mycalex molding at a saving of fifty per cent in the cost.

Mycalex thus admits of treatment in mechanical construction impossible with other inorganic insulating materials, as mica, porcelain, etc., and in this feature alone offers unusual advantages upon the basis of redesigning.

Another interesting construction rendered more effective and less expensive by the use of Mycalex is that of insulated pipe joints.

Pipe Line Joints

There have been many instances where it has been desired to provide pipe lines with insulated joints to avoid conductance of stray currents or to insure safety to operators where dangerous voltages are transmitted, as in power houses, car barns, etc. Mycalex for this purpose is of considerable interest as it will permit the manufacture of a unit-insulated pipe joint in a form that can readily be installed by the ordinary plumbing or steam-fitting operations. Furthermore, the Mycalex will withstand hot and cold water, many solvents, gases and other materials and conditions attendant upon the use of piping systems.

The heat resistance and mechanical toughness of Mycalex have proved advantageous in the

(*Continued on page 523*)

(2) "Properties and Applications of Mycalex to Radio Apparatus" by W. W. Brown, Proceedings of the Institute of Radio Engineers, Vol. 18, No. 8, August, 1930, pp. 1307-1315.

Technical Advantages and Characteristics of the Phenolic Resinoids*

By Leon V. Quigley

Technical Editor, Bakelite Corporation

THE history of humanity is a record of transition no less in materials than in mankind. Particularly is this generation replete with change. There is unparalleled attention to research, which is deemed necessary to survival. Research is responsible for new materials and their application. The total effect of material transition, either upon industry or upon the workers, is impossible to assay. Sometimes resinoid replaces steel. Again conjoined with sheet steel, it replaces stone, and opens a new metal market. Gleaming corridors of great buildings bear evidence. Optimum application of material must involve conservation as well as efficiency. A study of the engineering factors involved in material replacement becomes, therefore, increasingly important.

A recent issue of THE INDUSTRIAL BULLETIN, published by Arthur D. Little, points out that the aggregate value of the products of the plastics industry is already more than one-tenth that of the products from both the lumber and wood-working industries of the United States. Yet the wood industry has been long established, while the plastic industry might be considered as still in the industrial nursery.

When a new class of material begins to rank with metal, stone, and wood as one of the four principal materials of construction, it becomes properly a subject for thoughtful consideration by engineers.

Properties of the new material are to be evaluated, and not only in the absolute sense but in relation to the properties of materials which they may replace.

Properties

Phenol - resinoid materials have attained their present widespread adoption because they are possessed of a remarkable assortment of properties and because they possess remarkable ease of adaptability. It is these two factors which chiefly govern the adoption and industrial position of any material.

The most important group of industrial plastics, which appears to be still in its infancy so far as varieties are concerned, is the class in which synthetic resins are used as a binder. The earliest of these and by all odds still the most important are the phenolic - resinoid materials. They possess extreme plasticity in the formative period. The finished product is resistant to practically all of the normal conditions tending to structural breakdown. It is characterized by a high degree of electrical and thermal insulation, and presents attractive surface, requiring practically no polishing as it comes from the mold. Structurally, the material possesses a degree of toughness and strength unusual in organic substance, and where this is not adequate, as in the case of fine machine threads, it is possible to mold metal threaded inserts into the finished piece.

Applications

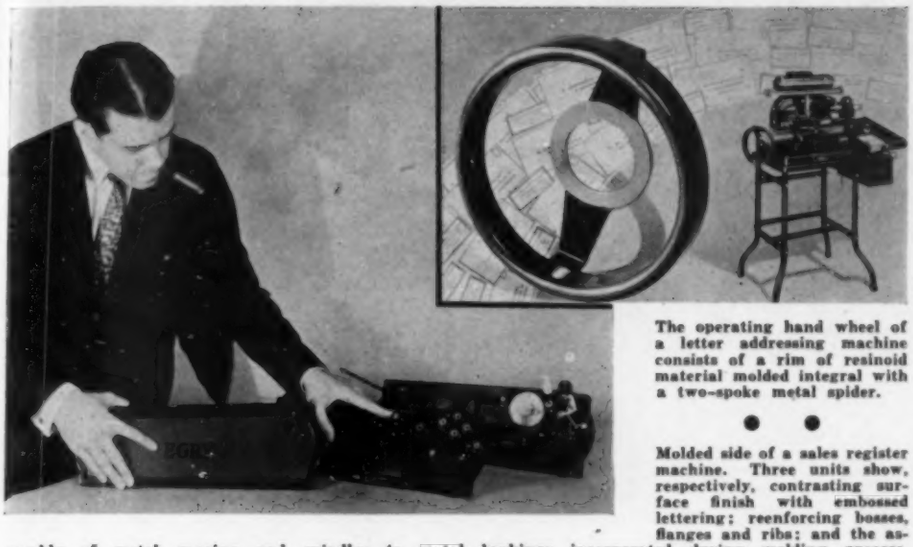
The following, in order of importance, are the chief industrial fields using resinoid molding material:

1 Electrical manufacturing
2 Radio
3 Automotive
4 Mechanical
5 Gifts and novelties
6 Electrical, central station
7 Bottle and tube caps, packages

Panel No. 44 (left top) was coated with Bakelite varnish, and was attached to a wall so as to be immersed at tide level, and was thus alternately exposed to water and to atmosphere, or the sun, during a period of ten months. Panel No. 26 (top right) was coated with what appeared by test to be the best of thirty commercial spar varnishes, and was exposed to conditions obtaining for panel No. 44, for a period of five months. Actually panel No. 44 seemed to have suffered hardly any effect from the severe tropical exposure, while panel No. 26 appeared rough, and seemed to have lost practically all of its varnish coating.

Panel No. 43 (left bottom) coated with varnish made from Bakelite synthetic resins, after exposure in the sun at an angle of 45° facing south, at Miami, Florida. Panel No. 29 (right bottom) coated with varnish which appeared by test to be the best of 30 commercial spar varnishes, after identical exposure on the same rack with panel No. 43. The relative retention of surface finish is evidenced by the far greater reflecting powder, or surface lustre of panel No. 43.

*Especially prepared for PLASTICS & MOLDED PRODUCTS, a condensed version appearing in the PLASTICS PRIMER distributed at the recent Chemical Industries' Exposition.



The operating hand wheel of a letter addressing machine consists of a rim of resinoid material molded integral with a two-spoke metal spider.

● ●

Molded side of a sales register machine. Three units show, respectively, contrasting surface finish with embossed lettering; reenforcing bosses, flanges and ribs; and the assembly of metal gearing and spindles to metal bushings incorporated during molding process.

8 Building and hardware
9 Telephone
10 Textile
11 Chemical
12 Miscellaneous
13 Aviation

Because of the unusually large range of uses to which the materials have been found suited, a great many subdivisions of the materials have developed. It is possible to modify resinoid materials with respect to some 30 different properties. The result is that a single company may manufacture as many as 500 distinctive resinoid products. The properties of the resinoid product are also modified by the addition of such materials as wood flour, asbestos, graphite, linen, canvas, and paper.

Phenol Resinoids Made Not Found

Natural resins are useful for many purposes, notably in varnish making. The phenol-resinoid materials yield a superior varnish but they go beyond this to become materials of construction. Chemists in the latter part of the Nineteenth Century knew that there was some possibility of making a synthetic resin from the reaction of aldehydes and phenols. Until the work of Dr. L. H. Baekeland, however, the world waited for an industrially successful superresin which could serve as a material of construction. Announcement of the invention was made in 1909. When it was recognized by the award of the Perkin medal, which is bestowed for outstanding industrial achievement, Dr. Charles F. Chandler, of Columbia University, epitomized the significance of the invention as follows: "Before Baekeland had published the results of his work, there existed not a single industry, nor a single application of any importance based on these condensation products. Since then, there have been started here and in Europe numerous factories where these processes are used for the most varied purposes, ranging from the manufacture of a billiard ball to that of a wireless telegraphic apparatus; the manufacture of a self-starter for automobiles to a wide range of uses, embracing such articles as switchboards for battleships, moldings for kodaks, armatures and commutators for dynamos and motors, telephone receivers."

In its physical appearance, Baekeland's product resembled the natural resins. Lokewise in its initial state, it could be melted readily and dissolved. But, in a later state, it became quite different in properties. The agency of this change was heat; the process is described as polymerization. When this change has been completed, the resinoid is radically different from natural resins. In careful appreciation of the physical resemblance and chemical dissimilarity, Baekeland adopted a distinctive term for his new material. This word is resinoid.

Liquid Materials

Resinoid varnish, lacquer enamel, and cement of the baking type, have been successfully employed by industry during a period of more than twenty years. Principal applications have been in the several lines of electrical manufacture. For instance, the cement serves to base electric light bulbs in their metal sockets, and in the radio industry it serves a like function with respect to the tubes—these latter, however, having a molded resinoid, rather than metal, base. In the field of electrical machinery, resinoid varnish has served to impregnate coils and windings, contributing properties of high insulation as well as mechanical bonding strength. In the chemical industry these have been a number of interesting applications.

In spite of these successes, the fact remained that large consumption of a coating material comes about when it is applied as surface protection over large areas. While, from the standpoint of properties of durability, this application could be well served by the resinoid varnishes and lacquers, there was, until recently, the objection of the baking operation. Not so much did the objection rest with the additional time consumed and the plant equipment required, as it did with the definite limitation which prevents the economical baking of units much larger than a motor car. The field of outdoor storage tanks, rolling stock, houses and buildings,

pipe lines, etc., demanded the development of varnishes or lacquers which, while retaining most of the durable properties of phenolic resinoid material, would be "air-dry", thus permitting the elimination of the baking operation.

Only recently have distinctly new types of phenol condensation products been developed which are soluble in drying oils without the necessity of using rosin or any inactive ingredients to promote solubility. These new resins are available in several different grades ranging from soft, semi-liquid materials to very hard, high melting resins. Their color ranges from dark brown to practically colorless—the latter suitable for use in light colored enamels. All of them, however, are soluble in China wood oil and most of them in linseed oil. Now possible, for the first time, is a quantitative study of the unusual effects exerted by phenol resinoids on drying oils without the interfering effects of unknown or inactive ingredients. Thus, by repeated experimentation, it has been found that varnishes containing phenol condensation products, possess unusual ability to withstand severe weather conditions. Unlike any other powerful, accelerating effect on drying all varnishes. This has made possible the preparation of rapid drying varnishes and enamels without using excessive quantities of metallic driers and without sacrificing toughness and durability.

Properties of Varnish

Although the new synthetic resins produce varnishes that are quite hard and difficult to scratch or mar, they are unusually tough and flexible, as shown by Kauri reduction determinations and measurements of film characteristics such as tensile strength and elasticity. Even when used in small proportions with drying oils, and particularly with China wood oil, the new synthetic resins have been found to yield coatings which have greatly improved resistance to weak alkalies, soaps, etc. The addition of the new synthetic resins serve to improve the quality or water resistance in oil varnishes. The films produced are remarkably resistant to the passage of moisture.

Additional advantage is that addition of the new synthetic resins improves the quality of acid resistance in the resulting varnish.

Possessed of properties and characteristics such as have been briefly enumerated, the new synthetic resins for quick, durable air-dry finishes, promise a range of materials which may well compete with nitrocellulose lacquers and with oil varnishes of the older type. Likewise, the varnishes made from them possess advantage over the earlier products made by incorporation of both natural and synthetic resins. This type of product required, unfortunately, an appreciable bulk of the ingredient first named, to promote miscibility even though the natural resin was, of itself, relatively inactive and non-contributing to the effect of surface durability.

Varnishes made with the resins just described are adaptable to practically every phase of surface protection. They are applied, therefore, to automobiles and to railroad rolling stock, to all forms of marine transportation equipment, to machinery storage tanks, pipe lines, and to houses and industrial buildings.

Conclusion

In this review an effort has been made to show the origin, comparative properties, and present industrial position of phenol-resinoid material. This resinoid class of substance which is a product of the research laboratory has been considered as a major class among materials of construction. It has been ranked, by reason of its versatility, with wood, stone, and metal. Resinoid has been so nominated, after consideration of its rapid advance, permanence of achievement, and future promise—particularly with regard to its unusual combination of properties adapting it to every field of engineering and in consideration of its thousands of important industrial aplications.

Twelve Patterns In New DuPont Toiletware Line

THE new 1931 line of toiletware developed by the Du Pont Viscoloid Company is now being displayed for the first time in one of the Boardwalk windows of the Du Pont Exhibit in Atlantic City. The new patterns are known as Ebonette, Ciro, Charmant, Camille, Laurel, Lucille, Lorain and Lucerne, du Pont onyx in Minerva and Mayfair, and translucent patterns of Fleur d'Or and Floral. Popular priced three-piece toiletware sets in attractive colors and designs for the little miss are among the items on display.

The new colors include rose, maize and jade pearl on jet; jade, rose, blue and maize pearl on pastel; jade, maize, rose and orchid pearl on amber, decorated and plain; du Pont onyx in jade, rose and maize; and translucent patterns in jade, rose and maize. The onyx sets are new features in the toiletware industry and are in line with the present vogue for onyx in other fields.

Complete sets, attractively boxed, and odd pieces of other designs are arranged around an unusual centerpiece, the background of which gives a message concerning the accessories displayed.

EASTMAN CELLULOSE ACETATE

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THE advantages and superiorities of cellulose acetate are rapidly expanding the uses of this material in the plastics industry. Eastman Cellulose Acetate is especially suitable due to its high standards of quality and rigid specifications.

Non-fading colors in the brightest of hues can be incorporated in Eastman Cellulose Acetate since its inherent stability leaves them unaffected even after long exposure. The surface of finished articles made with this material easily takes a high luster which is unusually long lasting and resistant to abrasion. Mechanical and dielectric strength make Eastman Cellulose Acetate especially useful in appliances where unusual insulation is required.

Whether your product uses transparent sheets, solutions, or the dry acetate itself, there is a grade of Eastman Cellulose Acetate that will exactly fit your requirements.

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EASTMAN KODAK COMPANY

Chemical Sales Department — Rochester, N. Y.

The Technology of Molding Cellulose Acetate*

By Robert L. Simmonds
Celluloid Corporation

THE first serious attempt to commercialize Cellulose Acetate was in the production of artificial silk, and it is now firmly established as a material for artificial fibres. In other fields also Cellulose Acetate has recently enjoyed increased popularity, particularly in the manufacture of films, chiefly in the photograph industry on account of their non-inflammable properties.

Cellulose Acetate film is moreover an excellent insulator and its use for insulating work has rapidly increased. It combines good tensile properties with remarkable electrical strength, and yet can be made so flexible that it will readily adopt itself to the contour of an irregular conductor.

The transparency of Cellulose Acetate film to ultra-violet rays is utilized in the manufacture of the so-called flexible glass. The thin flexible film is supported on a fine metal gauze and is used on a greenhouse construction, chicken houses, etc.

Advent as Molding Material

More recently Cellulose Acetate has been used very largely in the manufacture of molding materials. The acetate compositions are hot pressed and caused to take up any desired shape.

Sales appeal is greatly enhanced by an appearance that compels admiration, but permanent sales value can be obtained only when beauty goes hand in hand with strength and permanency. Therefore, a molding material to meet the requirements of this modern age must possess an unlimited color range, stability of color, strength and resiliency. Furthermore, the molding material must be such that it can be used on present molding equipment, that volume production can be easily attained, and that the cost of the finished molded article be reasonable.

Practically any color effect, mottled or solid, can be produced in any desired degree of transparency, translucency or opacity. Color effects are greatly heightened by the luster. The natural surface finish is possessed by the article when it comes out of the mold, requiring no polishing operations. If desired, a highly reflecting surface and glass-like appearance can be obtained by buffing. With the limitless combinations available, a considerably variety of beautiful colors and color effects is possible. The extensive range of colors and patterns are being continually enlarged to meet all of the demands for artistic effects.

Properties of Cellulose Acetate molding material may be summarized as follows: It is tasteless, odorless, non-inflammable, non-shatterable, non-corrosive and does not deteriorate with age. In a transparent form it transmits ultra-violet rays to a marked degree. The material is light in weight and of homogeneous structure. It readily lends itself to machining operations such as sawing, drilling, routing and tapping, and finishing operations such as sawing, tumbling, polishing, etching, printing, stamping and engraving. If desired, pieces may be joined easily to one another or to the other substances such as wood, metal, etc.

For molding purposes, the material is obtainable in the form of powder, chips, or slabs from which blank forms can be cut for the molding operation. Powders, of a fineness to pass through a 1/16″ screen, are used principally in positive molds where the charges are carefully weighed or measured. Chips of different colors, or a size to pass through a 3/8″ screen, are used for the production of beautiful variegated designs, and chips from mottled slabs produce still other exceptionally attractive effects. Unique decorative, stratified and mottled effects are obtained by using blank forms cut from slabs. Thus, almost any color effects specified can be obtained without difficulty.

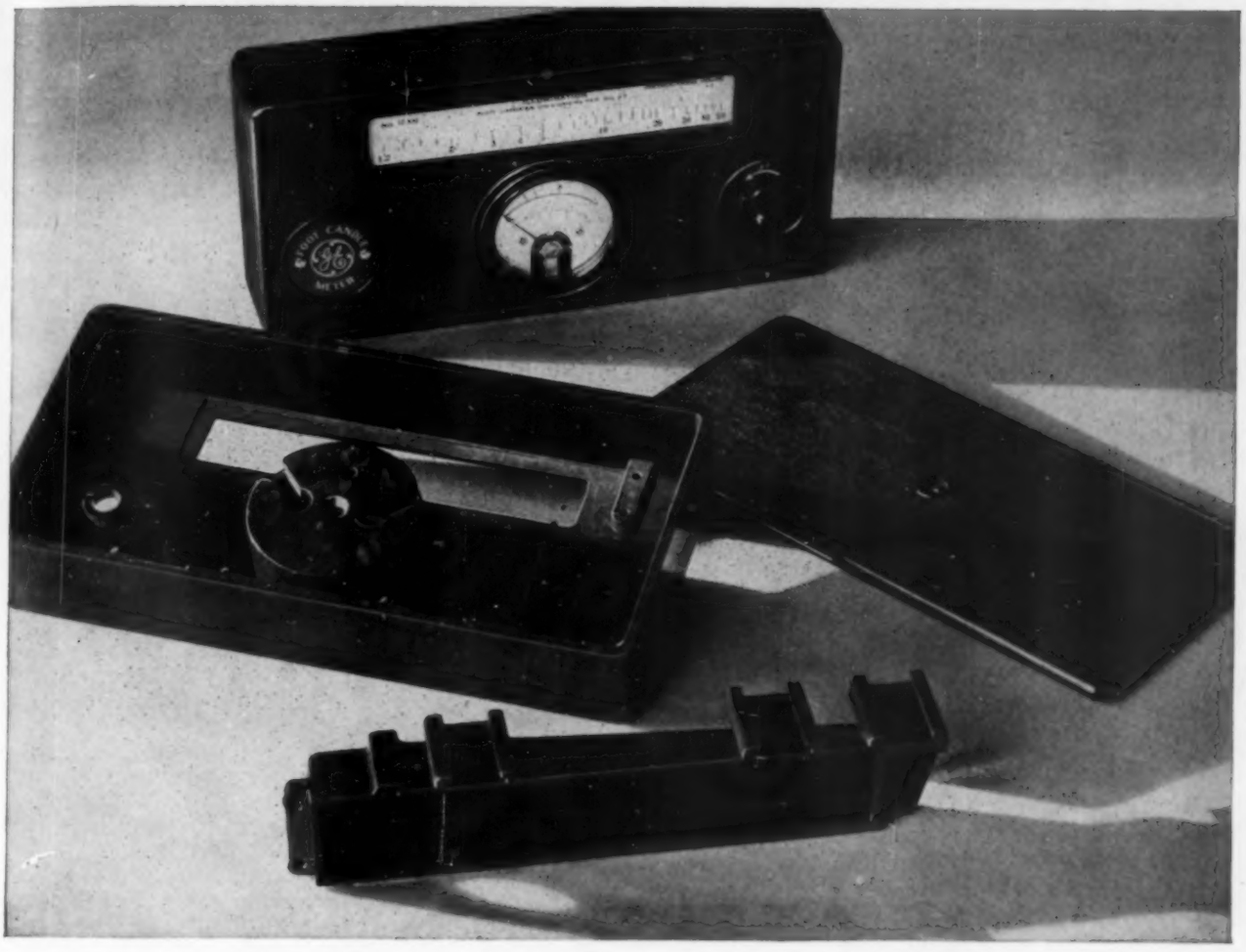
Varying Hardness

For molding, the material can be supplied in different types such as hard, normal and soft, and all types can be supplied, opaque, transparent, translucent, plain or mottled. The hard type is intended for articles having heavy sections where heat resistance and hardness are required. Normal type, while not so hard, is appreciably tougher and can be molded into thin sections without the danger of cracking. It meets the average requirements for automobile hardware, clock cases, de luxe containers, and similar devices. The soft type is easiest to mold, very plastic, and adaptable to applications involving

*Presented at the Plastics Symposium, 13th Chemical Industries Exposition, under the auspices of PLASTICS & MOLDED PRODUCTS, May 6 and 7, 1931.

TAILORED IN TEXTOLITE

Appearance Improved — Cost Reduced



SUBSTITUTION of Textolite molded parts for sheet metal greatly improved the appearance of this foot-candle meter and — equally important — resulted in a cost reduction of 15 per cent. Characterized by strength, durability, and beauty, the applications of Textolite are many and varied. Even if you are satisfied with your product, there may be a way to reduce its cost, improve its quality, or speed up production. To get in touch with the Textolite specialist in your district, address the nearest G-E sales office.

831-3

JOIN US IN THE GENERAL ELECTRIC PROGRAM, BROADCAST EVERY SATURDAY EVENING ON A NATION-WIDE N.B.C. NETWORK

GENERAL ELECTRIC

SALES AND ENGINEERING SERVICE IN PRINCIPAL CITIES

resiliency. In addition to the three standard types, special variations of it are obtainable. This wide range of physical characteristics makes available a material that can meet the physical requirements in its field.

Molding operations consist in heating the materials to a temperature between 265 deg. F. and 365 deg. F., at which temperature the material becomes plastic, and pressing it to the desired shape in the mold. The heating can be done either in the mold or on a steam table. There are no chemical reactions involved, and the overflow and scrap material may be reworked, eliminating all waste.

While the initial development of Cellulose Acetate was slow, it has recently more than compensated the earlier failures. Cellulose Acetate now needs no excuse. The modern product is its own justification.

B. E. S. A. Announces New Ebonite Standards

THE British Engineering Standards Association has just issued a revision of the British Standard Specification for electrical ebonite. In this new edition the scope has been widened to cover pure non-loaded ebonite in the form of sheets, rods, or tubes suitable for electrical purposes, including radio apparatus. Two grades of ebonite are now included, one of these being similar to that covered by the old specification and the other grade having superior and electrical and mechanical properties, this grade being intended for use where the highest quality material is required.

The majority of the methods of test are the same as those in the old specification, but in one or two cases the description has been amplified and recommendations are given for a method of detecting metallic particles in ebonite to be used for high-frequency high-voltage work.

Molders Discuss Routine Matters at Detroit July Meeting

ALTHOUGH business at the last meeting of the Molded Insulation Section of NEMA was of a rather routine nature, the attendance was more representative of the industry than has been usual of late. Mr. Prescott Huidekoper, vice-chairman of the section, presided when the meeting was called to order at 9:30, Friday morning, July 10th, at the Hotel Statler, Detroit. Mr. Louis G. Sylvester, chairman of the section, was unable to attend.

Company members and their representatives who signed the register included: American Insulator Corp., Mr. Prescott Huidekoper; American Record Corp., Mr. J. P. Case; Auburn Button Works, Mr. W. A. Freyer; Boonton Molding Co., Mr. G. K. Scribner; Boonton Rubber Mfg. Co., Mr. R. W. Post; Chicago Molded Products Corp., Mr. E. F. Bachner, Mr. M. C. Bachner, Mr. W. L. Kelley, Mr. John Agazim; Colt's Patent Fire Arms Mfg. Co., Mr. B. F. Conner; Diemolding Corp., Mr. Donald Dew; General Electric Co., Mr. Harry Randall, Mr. T. E. Giblin, Mr. R. E. Coleman; Kurz Kasch Co., Mr. C. A. Kurz, Jr.; Northern Industrial Chemical Co., Mr. G. V. Sammet, Mr. B. E. Schlesinger; Norton Laboratories, Inc., Mr. J. B. Neal, Mr. G. C. Wilson; Reynolds Spring Co., Mr. J. G. Rossiter, Mr. J. W. Longheed; Shaw Insulator Co., Mr. Frank H. Shaw.

Also present were Mr. E. S. Aumend of NEMA, Mr. H. Stevens and Mr. M. Barchard of General Industries, Inc., and Mr. Robert C. Gilmore and Mr. R. C. Gilmore, Jr., of Plastics Publications, Inc.

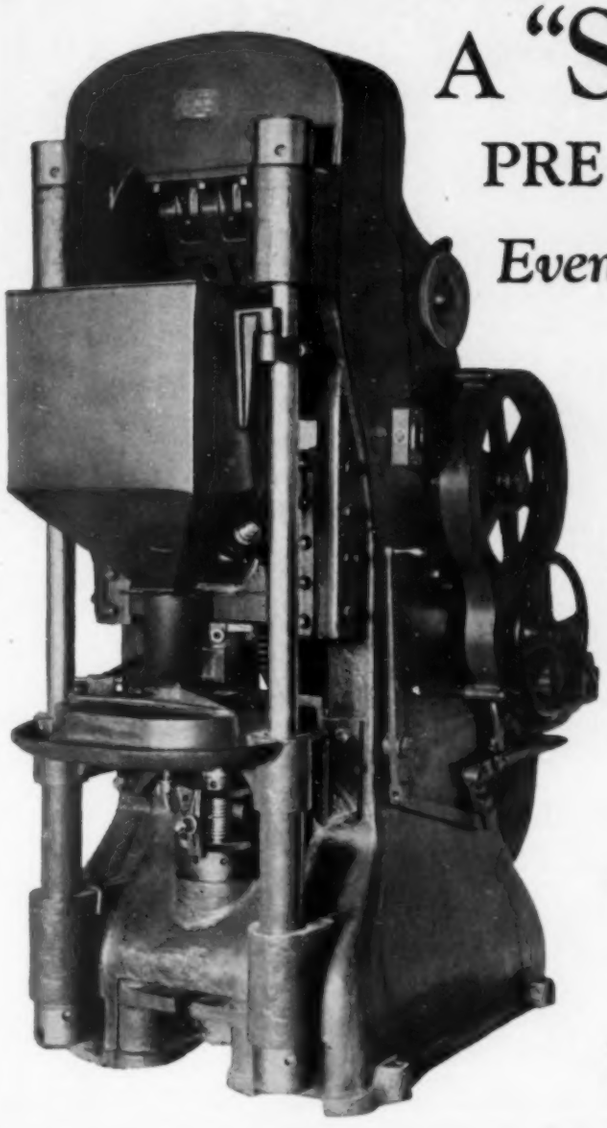
After the customary approval of the minutes of the previous meeting, several official communications from NEMA headquarters were read and incorporated into the record. These included notification of the appointment of R. E. Coleman and F. J. Groten as associate representatives of the General Electric Co., in the Molded Insulation Section. Another appointment was made, that of Mr. J. P. Case as executive representative of the American Record Corp. Mr. Case is a vice-president of his company.

Another headquarters communication suggested that members of the section purchase the newly released standard telegraph code which NEMA is sponsoring.

Reporting for the trade extension committee, Mr. Rossiter, chairman, stated that the various interests in the plastic molding industry, including material supply houses and equipment manufacturers had considered a survey and industry plan made for them to be of value and that sub-committees of the three interested groups would study the plan further for possible joint action. It was also announced that the personnel of the Trade Extension Committee would be augmented with the addition of Mr. B. F. Conner, Colt's Patent Fire Arms Mfg. Co.

The joint meeting of the Section and the cost estimating committee, consisting of the member companies' accountants, was not held as scheduled but postponed for a later meeting. As a point of information, the question was raised as to the method of collecting unidentified sales statistics. This was outlined by Mr. Aumend, NEMA representative, and approved.

The members of the section were guests for luncheon at the plant of the Arthur Colton Co., manufacturers of preforming presses and pharmaceutical machinery. After a sumptuous meal, the molders inspected the plant, seeing some of the very latest collapsible tube-filling machines after which moving pictures, both industrial and entertainment, were shown.



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MULTIPLIES THE LIFE OF COSTLY DIES AND ALL WORKING PARTS

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MAKALOT has been successfully used for many difficult molding jobs where **every other molding compound had failed.**

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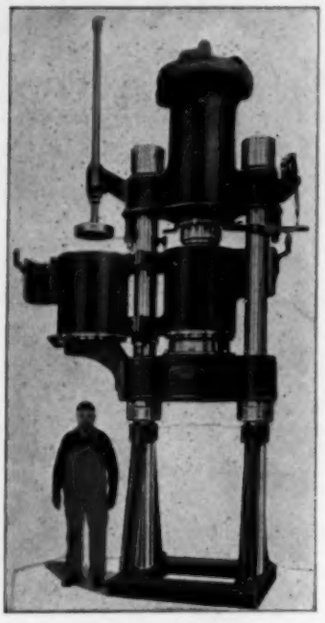

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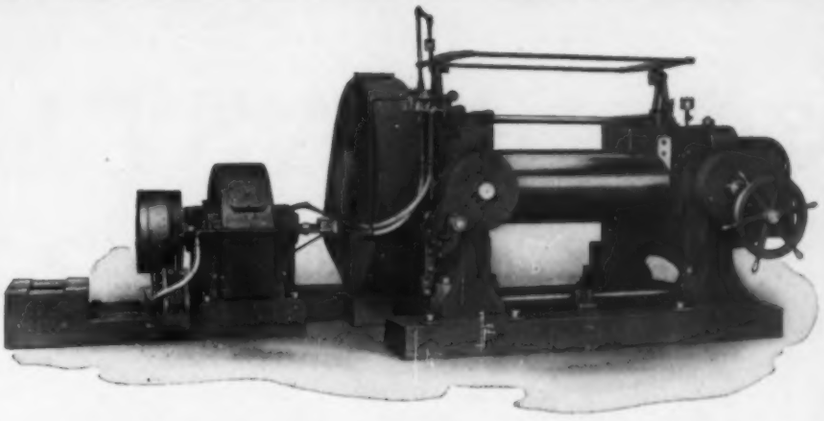

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The pneumatic clutch brake incorporated in the drive of these sheeting rolls provides for quick stopping in case of emergency as well as for service operation. For the latter the control is so designed that the rolls are stopped gently and without strain, and is located for convenient operation from the front of the machine. Used as a safety feature the pneumatic clutch brake is quick and positive, meeting fully the requirements of the strictest safety code.

Other features are: — hard, chilled iron rolls of the well-known Farrel high quality — correctly proportioned housings and bearings—handwheel adjustment for the front roll—cut spur drive gears —guards designed for running gears in oil bath — Farrel-Sykes continuous tooth, double helical reduction gear unit with automatic lubrication for gears and bearings —drive on same floor level with rolls.

Farrel-Birmingham's long experience in building rolls and other heavy machinery for the rubber and plastics industries, combined with a competent engineering staff and modern plant facilities, assures equipment of the highest type correctly designed for its particular function.

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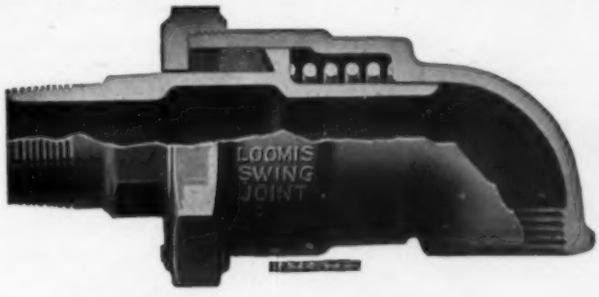

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NEWS *of the* INDUSTRY

Landes and Wilson on Committee for Packaging Exposition

FOLLOWING the first American Packaging Exposition, Conference and Clinic held at the Hotel Pennsylvania, New York City, last May under the auspices of the American Management Association and attended by more than 2,000 packaging buyers, experts and specialists, a broadened and much larger Packaging, Packing and Shipping Conference, Clinic and Exposition will open in the Palmer House, Chicago, for a six-day session beginning March 7th, 1932, and ending March 12.

The advisory committee cooperating with Irwin D. Wolf, who is in charge of the combined events, includes W. S. Landes, President, Celluloid Corporation, and G. C. Wilson, Sales Manager, Norton Laboratories, Inc.

Bakelite West Coast Agents

BAKELITE Corporation, New York, announces the appoint of Martin, Hoyt & Milne, Merchants Exchange Building, San Francisco, as the company's agents for Bakelite products for varnish manufacturers in the West Coast territory. The Electrical Specialty Company, 1575 Folsom Street, San Francisco, retains the agency, in Pacific Coast territory, for all other existing Bakelite products. Martin, Hoyt & Milne have branch offices at Los Angeles, Portland, and Seattle.

German Production of Phthalic Acid Esters

GERMAN production of diamyl, dibutyl and diethyl esters of phthalic acid employed principally as plasticisers, is estimated at approximately 200 metric tons annually. The German dye trust holds patents for the production of phthalic acid.

THE Molded Insulation Section of NEMA will hold its next meeting during the annual session of the parent organization to be held at the Hotel Commodore, New York City. The molders will convene on Friday morning, September 18th, at 9:30 A. M. Business will include the election of officers for the ensuing year.

Silver of Stokes Machine to Visit Liverpool's Lord Mayor

JOHN A. SILVER, Advertis- Manager and Assistant Sales Director of the F. J. Stokes Machine Co., makers of Chemical and Pharmaceutical Machinery, of Philadelphia, Pa., sailed on the Bremen August 21st for a six weeks' combined business and pleasure trip to England and the Continent. His itinerary includes a conference in Liverpool with Thompson and Capper, Ltd., Stokes' English representatives. He will return the visit of Edward Thompson, Lord Mayor of Liverpool, and senior member of the firm, who recently spent some time in this country. Mr. Silver will also travel in Germany and France, returning to America in early October.

Bucyrus-Erie Co. May Acquire National-Erie

BUCYRUS-ERIE CO. has been negotiating for the acquisition of the National-Erie Co., manufacturers of hydraulic press equipment, whose plant has recently shut down for an indefinite period.

A new factory is scheduled to begin production of pyroxylin plastic in Cervena Recice during the current month. The factory will operate in the Pelhrimov district (Bohemia). Acting Commercial Attache Sam E. Woods, Prague.)

Roberts in Waterbury Button New York Office

MR. Warner A. Roberts, who was connected with the home office is now located at the New York office, 1133 Broadway, covering sales of Waterbury Button molded line, which includes Bakelite, Durez, Beetle, Lumarith, shellac and other materials.

With the addition of several new 100 and 300 ton Electro-Draulic Presses, Waterbury Button Co. announces that it is equipped to handle a wide variety of molding jobs, having been limited to smaller pieces heretofore.

KELLER Mechanical Engineering Corp. has ready for distribution their new booklet on Automatic Toolroom Machinery Types G and GG. In it principles of operation, description and specifications, and the method of production of several dies and molds are detailed.

Steel-Draulic Works, Decatur, Ill., announces a new line of hydraulic molding equipment and accessories. The presses are made entirely of laminated steel, a method which combines the great strength of rolled steel with its low cost and adaptability to a wide range of design and eliminates the use of iron or steel castings and their inherent limitations such as necessity for patterns, extensive machine work, excessive weight and uncertain performance. The elimination of castings results in lower costs, increased strength, great rigidity, less weight and a freedom in design which allows many new features and refinements and makes it possible to build equipment of unlimited size and variety to meet particular requirements at surprising savings of investment and time.

CELLULOSE ACETATE

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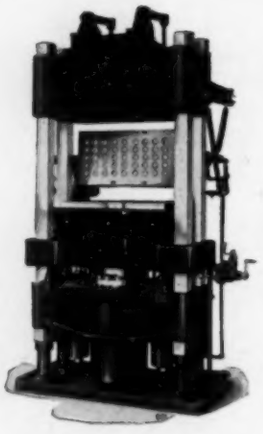

A new tilting die molding machine, (patented). The die or die head tilts mechanically as the platen moves. The only hydraulic cylinders are the pressing and return cylinders. Rigid, accurate, reliable.

Several installations made in large plants.

We build all types of molding presses. Write for catalogs.

The French Oil Mill Machinery Company

Piqua, Ohio

New York Pittsburgh Akron Chicago

Stedman Opens New Offices

A GREAT deal of interest was aroused when Stedman's Foundry & Machine Works, of Aurora, Indiana, entered the Swing Hammer Mill field with a complete line of Swing and Ring Hammer Crushers, Grinders, Pulverizers and Shredders.

The increased volume of business made necessary the recent opening of Stedman offices in these additional cities: Pittsburgh, Charleston, W. Va., Kansas City, Mo., Chicago and Vancouver (British Columbia).

A new catalog describing the Stedman line of mills has just come off the press. If you desire a copy, write Stedman's Foundry & Machine Works, Aurora, Indiana, and ask for catalog 302.

Financial Statements

MONSANTO CHEMICAL WORKS and subsidiaries—For the quarter ended June 30 report net profit of $416,076, after charges and Federal taxes, equal to 97 cents a share on 429,000 no par shares of stock. This compares with $255,378, or 59 cents a share on 429,000 shares in the preceding quarter and $329,227, or 80 cents a share on 410,307 shares, in the June quarter of 1930. For the six-month period ended the same date net profit was $671,454, after charges and taxes, equal to $1.56 a share on 429,000 shares, which compares with $622,397, or $1.51 a share on 410,307 shares, in the first six months of 1930.

FORMICA INSULATION COMPANY—Reports for six months ended June 30 net profit of $135,960 after charges and taxes, equivalent to 75 cents a share on 180,000 no-par shares of capital stock. This compares with $185,454, or $1.03 a share, in the first six months of 1930. Net sales were $1,084,520, against $1,316,181 in the like 1930 period.

REYNOLDS SPRING COMPANY—For six months ended June 30, reports net loss of $14,009 after depreciation and interest. For the first half of 1930 the company and its subsidiaries reported net loss of $96,046 after depreciation and interest. For the quarter ended June 30 net loss amounted to $2,405 after depreciation and interest comparing with net loss of $11,604 in the preceding quarter which compares with net loss of $80,029 in the June quarter of 1930.

From a Letter . . .
August 17th 1931 . . .

It is with great pleasure that we can advise you at this time, we feel your publication has done a great deal in the past year and we want to congratulate you and the management for their steadfast efforts in developing our Industry Publication.

Yours very truly,

REYNOLDS SPRING COMPANY
MOLDING DIVISION

Sales Manager.

JGR/LD

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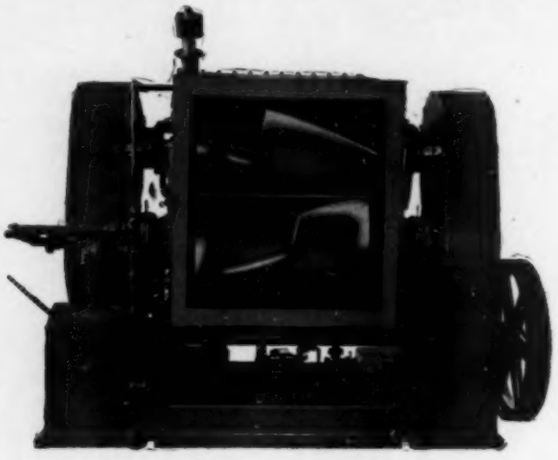

SIZE 16, TYPE VI, CLASS BB
With jacketed trough shell and jacketed ends— viewed in discharging position.

DESIGNED expressly for the job—that is the important thing about Baker Perkins machinery.

Mixing and Kneading machines, similar in principle, may vary widely in their details of construction and the details are vital to success. Whether your product is an asphalt compound or cold molded insulation, cellulose nitrate or cellulose acetate, phenolic or urea resin, we have created designs and can build machines correct in every detail to meet the requirements peculiar to each product.

To help you find the right machine for that **new** product, we invite you to make use of our experimental laboratory—and to draw on our fund of experience, gathered over half a century in every industrial country of the world.

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Fountain Pen Barrels Formed By Bonding Plastic Strip Materials

Waste is minimized by new fabricating process which eliminates turning solid stock

A polygonal fountain-pen barrel, made without any substantial waste of material by the simple expedient of building up the barrel from strips and filling it with a solvent, is described by Eben McCree, of Arlington, N. J., in his U. S. P. 1,795,569; March 10, 1931.

Heretofore in the manufacture of bodies for writing instruments, such for instance, as barrels for fountain pens, there has been a very high percentage of wasted material. According to the usual procedure, bars of suitable material are bored longitudinally and this results in the loss of about 90% of the material in the borings.

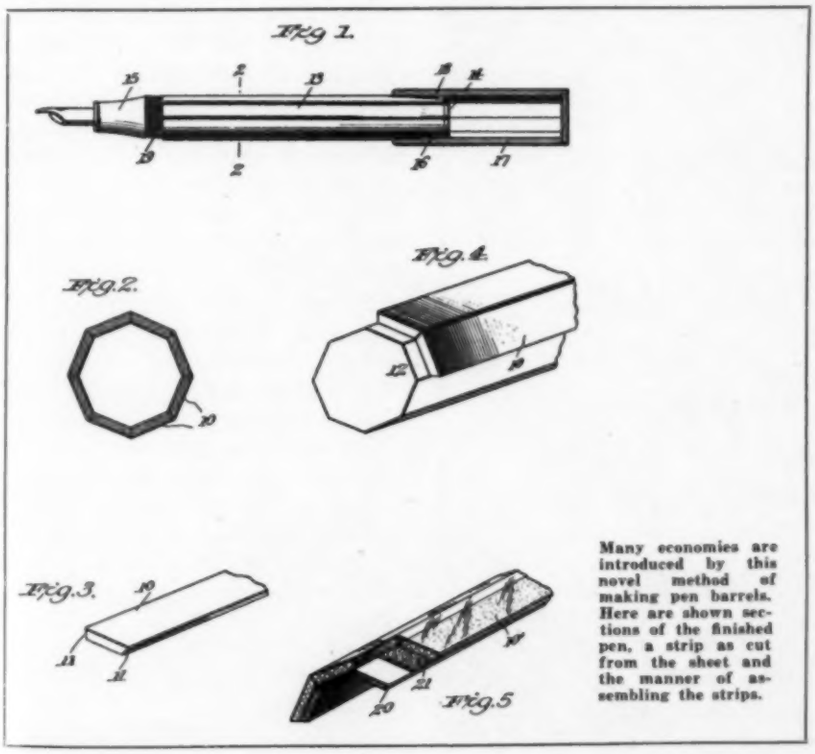
According to the present invention this method is entirely discarded, and by the method of procedure the element of waste is eliminated entirely. Briefly, the invention consists in forming the material such as rubber, pyroxylin, celluloid, casein, galalith, etc., into sheets, cutting the sheets into narrow strips, and laterally uniting the strips to form the tubular unit.

Outside of the feature of economy, it is possible in practicing the invention to secure artistic effects impossible under the old method. The sheets of material may contain various coloring matters to secure desired effects, or the barrels may be built up of strips of various colors. In this manner any color combination such as school or club colors may be produced.

In the drawings:

Figure 1 is a side elevation of a pen with the cap shown in section.

Figure 2 is a section on the line 2—2 of Figure 1.



Many economies are introduced by this novel method of making pen barrels. Here are shown sections of the finished pen, a strip as cut from the sheet and the manner of assembling the strips.

Figure 3 shows a strip as cut from the sheet.

Figure 4 illustrates the manner of assembling the strips; and

Figure 5 shows several strips of a modified form.

For clearness of illustration, Figures 2 to 5 are enlarged views.

As the first step, the selected material is brought into the form of sheets of suitable thickness, whereupon, by means of a gear cutter or other suitable instrumentality, the sheets are cut into narrow strips, such as 10 in Figure 3, the lateral edges of the strips being beveled as at 11, during the cutting operation. The barrel is of polygonal form, and consequently, the angle of bevel will depend on the number of sides which the barrel is to have, and also, upon the desired perimeter. The strips thus prepared are placed upon a mandrel 12, which latter is of the desired polygonal form. After the strips have been placed around the mandrel with their lateral edges in contact, they are held thus by any suitable means, such, for instance, as rubber bands and the mandrel is withdrawn. Retaining the strips in this condition of assembly there is introduced into the interior of the tube a suitable solvent, the nature of which will, of course, depend upon the nature of the material of which the strips are composed. When using pyroxylin strips, for instance, a suitable solvent would be amyl acetate, or ethyl acetate, or their equivalents. The solvent enters between the contiguous edges of

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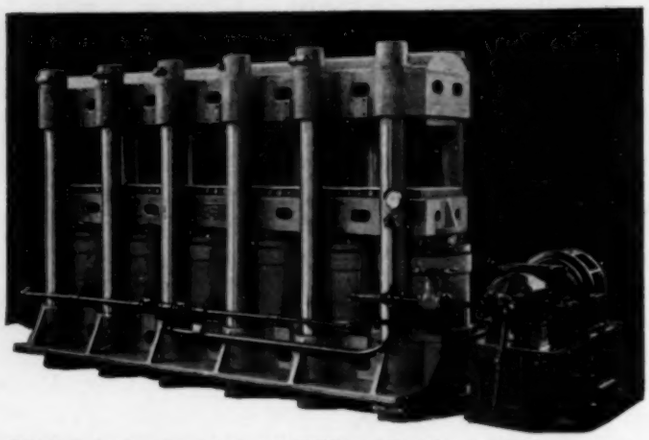
We design and build hydraulic press equipments to solve any manufacturing problem. Consult us.



This six ram press, operating under 3000 pounds sq. in. per working pressure delivered by a self-contained pumping unit, exerts a total pressure of 2280 tons on the 24" x 144" rolled steel steam plates, holding this pressure for long periods.

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FORMALDEHYDE

Clear . . . Colorless . . . Low in Acid . . . Uniform in Strength

. . . for the production of white or light colored plastic products.

Corrosion of apparatus is minimized . . .

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the strips and its function is to render these edges temporarily plastic, so that they will intermerge, thus bonding the strips together to form an integral unit, this action taking place at normal room temperature without any special application of heat. Any excess solvent is quickly removed and the tube is placed away for a short time in order that the joints may harden completely. Eventually the tube may be cut up into suitable lengths as 13, Figure 1.

Cap Built Like Barrel

A cap 14 is bonded on one end of the barrel and a writing-head 15 is inserted in the opposite end in the usual manner. The end of the barrel is rounded off as indicated at 16 of Figure 1, in order to receive the cap 17 more readily, this latter being constructed in the same manner as the barrel. The strips for the cap are provided with portions 18 of somewhat greater thickness than the main portions of the strips. These thicker portions are intended to receive the threads which are adapted to engage threads 19 of the head 15.

The method of bonding the strips together to form an integral unit, has the further advantage of eliminating all visible lines of juncture between the strips, and a barrel thus formed, cannot be distinguished on these grounds from one which has been moulded or tooled from a single piece of material.

Some of the composites which it may be desired to use are of brittle or otherwise delicate nature and these are reinforced by means of stronger strips 20, (Figure 5,) united with strips 10′ by means of cement. This union is effected while the materials are still in sheet form and under pressure so that the laminations are rigidly bonded together, and the resultant sheets are subsequently cut into strips in the manner described above.

In case strips 10′ are of trans-

parent or translucent material, it may be desirable to insert between them and backing strips 20, strips 21 of decorative value. In such case, the strips are all united in the manner mentioned.

A barrel constructed in this manner is fully self-sustaining and does not require any reinforcing bands or the like. Even should a hollow mandrel be used during the arrangement of the strips, it would be entirely removed since the described barrel is completely self-sustaining.

Farm Wastes and Plastics

(*Continued from page 494*)

However, any other materials which contain pentosan may be successfully employed. In this connection, it should be explained that the method has nothing to do with the production of furfural, and in the practice of the method it is not thought that furfural enters into the reaction as an intermediate step.

For the phenol element crude cresylic acid has been used but obviously other phenolic bodies may be employed.

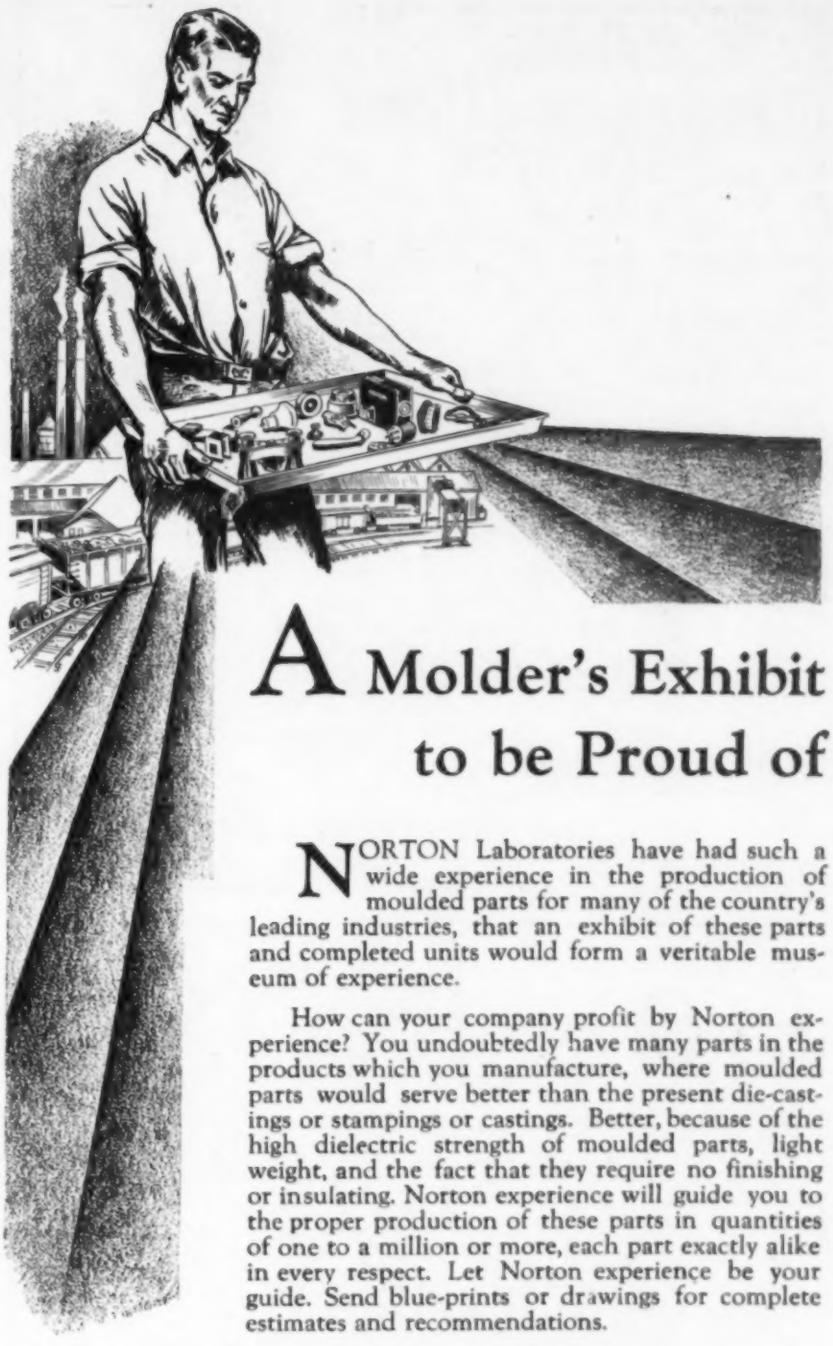
For the acid element hydrochloric acid and sulphuric acid and various acid liberating substances, such for instance as sulphur monochloride and antimony chlorides are used.

Monsanto Lets Contract For Warehouse

MONSANTO Chemical Works has let a contract with The Woermann Construction Company of St. Louis for the completion of a warehouse at its Monsanto, Illinois plant. Hoerner, Baum & Froese were the architects.

The building will be 92 feet by 170 feet and will contain about one million cubic feet of storage space.

The cost, with improvements, will be about $100,000.00.



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Faster and better jig sawing with the new "STANDARD" machine.

IMPROVEMENTS INCLUDE:
—Ball bearing countershaft.
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—Can be furnished with motor drive.

No. 1 machine has 9" swing between saw and arm.

No. 2 has 16" swing.

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Book Review

"Artificial Resins", by Scheiber and Sändig, English Translation by Ernest Fyleman, Sir Isaac Pitman's Sons, Ltd., London and Industrial Book Co., Inc., New York City, $9.00.

IN December, 1930 (PLASTICS, 1930, 6, 723), the writer gave a comprehensive review of a most meritorious and complete work on ARTIFICIAL RESINS by two German authors, J. Scheiber and K. Sändig.

As the field of artificial resins is one particularly closely allied with plastics and molded products, we feel certain that many of our readers, whose college German is getting somewhat "rusty" will welcome an English edition of this work. It is the translation of Ernest Fyleman, who evidently accomplished the none too easy work of translation at Cairo, Egypt; judging by his preface to the British edition, which is published by Sir Isaac Pitman's Sons, Ltd. American readers, however can obtain copies of this book through the Industrial Book Co., Inc., 280 Broadway, New York, N. Y., or through our book department. The American price, for a well printed and bound copy, is set at $9.00.

The English edition follows the German precisely, insofar as the text matter goes, so it will, at this point, not be necessary to review the subject matter covered in any great detail. Those who are interested, may look up the complete review in the December, 1930, issue of PLASTICS.

There is, however, quite a difference between the German and the English edition in so far as typography is concerned. The German text was on larger pages, and in considerably more legible type; although the press-work in the English edition is very excellent. In one respect the publishers might have followed the original German text with profit, namely by printing the less important parts of the original text in smaller type, as the Germans did it. The German text covered 318 pages, which, in the smaller page size, becomes 409 pages of text.

The work is characterized by very numerous foot-notes, which support the text by pointing out the sources from which the material is taken. There is also considerable valuable information in the foot-notes, which consist of references to patents of all civilized countries. This makes the book of particular value. But here we must, reluctantly to be sure, make a severe criticism of the English edition by pointing out an error which we sincerely hope our British friends, and publishers of the book, will remedy in subsequent editions of the work; which we feel sure will be necessary by reason of the otherwise excellent presentation of the subject matter. What we refer to is the practical absence of an index!

Can any one imagine that so complicated a subject as artificial resins can possibly be covered by a meagre 4¼ pages of "single entry" type of index? Authors and subjects are in the same alphabetization, an arrangement that is certainly not what we, as chemists, are familiar with. The index does not cover the subject at all, and is, at best, an alphabetical re-arrangement of what in most cases would pass for a "table of contents".

As a specific instance of the vast difference in the qualities of the index, and hence the availability of the subject matter, we might point that the subject of Coumarone resins, in the German edition, comprises 43 separate line entries, covering the subject in detail; whilst in the English edition there is a *single* line with three page numbers (9, 11, 241) after it! and the subject begins at p 228. Yet the text portion on these coumarone resins covers 31 pages.

A further serious omission is the entire disregard, in the indexing, of the foot-notes. The German text had a patent index, arranged by numbers under the various countries, covering no less than 15 pages; and an author index of 10 pages, and a *real* subject index of 12 pages; or a total of 37 pages; as contrasted with slightly over four in the English edition.

For those who can readily read German, the text in that language will undoubtedly be preferred. Any one who is in the research end of artificial resin production needs to refer, very often, to specific patents; but there is no way, in the English edition, of ever again finding any patent which one might have noted during his perusal of the text.

We sincerely hope that the publishers will have someone index this book, and supply those who are buying the English edition with an index, even if they have to charge a few dollars extra for it. It will be appreciated by the readers.

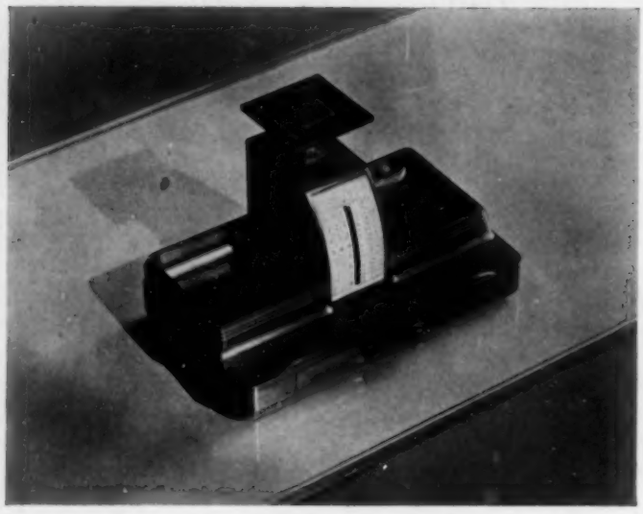
Another feature, that we might suggest, would be the omission, in American editions, of the German testing methods; which appear as an appendix to both the German and the English editions; this to be substituted by the standards adopted by the American Society for Testing Materials, as was done by Carleton Ellis in his work on the same subject in 1923.

The subject matter of Artificial Resins, or perhaps better "synthetic" resins, is becoming so important, however, that we can sincerely recommend this English edition for all those who find it impossible to make intelligent use of its German original.

Textually, the translation by Mr. Fyleman, is very accurate and readable, and he deserves much credit for having undertaken this difficult job.

By Carl Marx

Dennison Postal Scale Features Bakelite Molded



A cynosure of neighbouring eyes. Milton's allusion would not be degraded by reference to the new letter scale desk set, which has been added to the line of the Dennison Manufacturing Company. Chemistry provides the material in the form of several lustrous Bakelite parts, which go together to make an artistic assembly, housing the mechanism, and providing compartments for desk utility. Some of us, who had become so familiar with rustiness on postal scales that we thought it an indispensable characteristic, will be interested, and perhaps relieved, to know that the present material is non-corrodible, and that its beauty is more than skin deep. We are tempted to say that something new under the sun is now being used in a big way on a small scale. People, who ordinarily would not have a postal scale within reach, may even enjoy this one as a desk ornament. Even the postal system may be benefitted in the long run, for now others than mail clerks will know the prevailing postal rates, acquiring the habit of weighing, and affixing the correct postage before dropping their letter, or package in the chute.

Trolitul, New White Molding Material Is Introduced in Germany

THE Rheinisch-Westfalische Sprengstoffwerk of Troisdorf, Germany, has placed on the market a new material called "Trolitul". Chemically, this material is a polymerized vinyl compound. Its chemical designation is "polystyrol". Externally, its appearance is similar to that of glass, and when colored, like that of porcelain. It takes in coloring substances in any proportions.

The following properties of "Trolitul" are reported to have been established by a series of tests.

1. Flexibility: 600 kilograms to a square centimeter. This compares with 370 kilograms for glass, 300 kilograms for cast iron, and is equal to that of ebonite.

2. Shock elasticity: 10 to 11 centimeter kilograms to a square centimeter. This property is tested by pounding with a weight and illustrates the shock of a body falling to the floor. The value of 10 to 11 centimeter kilograms compares with 1.7 for porcelain and 6 to 8 for Bakelite.

3. Insulating property: almost absolute. It equals that of amber.

4. Heat resistance in Martens degrees: 60°. This test consists in clamping one end of a bar made from the materials to be tested and weighing the free end with weights to produce a stress corresponding to one of 50 kilograms per square centimeter. The temperature, in Centigrade, at which the bar will show a bend of 3 millimeters in a point 120 millimeters from the clamped end is the heat resistance in Martens degrees. "Trolitul" is in this respect equal to ebonite whose heat resistance is 50° to 80°.

5. Inflammability: 1. This test is according to a scale of five, zero being easily inflammable and 5 fireproof. "Trolitul" is therefore inflammable, but not to the same degree as ebonite whose inflammability is 0.

.6 Specific weight: 1.05. The new material is therefore lighter than aluminum (2.6) or glass (2.4 to 3.9).

"Trolitul" is insoluble in most acids and alkalies and is unaffected by alcohol.

Recommended for Extrusion

Objects from "trolitul" are prepared by casting under pressure (Spritzguss) and it is stated that metal parts can be imbedded in the synthetic material during the process. The casting apparatus is described as a vertical iron cylinder with a piston, having a steel orifice at the bottom opening into the mold. The material is inserted in the cylinder which is heated outside with gas and when in plastic state, is pressed out with the piston, whether by hand or mechanically.

Casein Solids Important Raw Materials

AN interesting class of plastic materials is manufactured from casein, a protein substance found in milk. Upon treatment of casein with formaldehyde, a tough material, white and hornlike in appearance, is formed. This material is noninflammable and capable of taking a high polish. Dyes may be incorporated with it or pigments or fillers used to produce a mottled or striated effect and the resulting appearance rivals that of ivory, coral, tortoise shell, and similar natural products. It is at present used for buttons, beads, fountain pens, and in the manufacture of numerous other fancy goods.

Well-Established Industry in Europe

The production of this material constitutes a well-established industry in Europe, where the product is sold under the name of "galalith." Production in the United States, however, is limited, and the domestic casein plastic industry is still in its infancy. Official statistics are not available but the domestic output is estimated at about 2,500,000 pounds annually.

Imports, chiefly from Germany, Austria, and Czechoslovakia, in 1930 amounted to approximately $174,000 in value, of which $168,000 worth was in the form of finished or semifinished articles and $6,000 of unfabricated stock.

From Commerce Reports.

Japanese Camphor Monopoly System Unchanged

SEVERAL months ago reports were current in the trade that the Japanese Government Camphor monopoly was to be turned over to private interests. Recent reports indicate that no change in the present system in Japan is even contemplated. (Assistant Trade Commissioner Howard B. Titus, Tokyo, Japan).

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Pile Driver Press Molds Plastic Materials

USING a process that employs the kinetic energy of a falling weight to mold a plastic body, is the theme of a process invented by Harry L. Bradley, of Milwaukee, Wis., U. S. P. 1,793,435; Feb. 17, 1931. The process has some resemblance to a pile-driver or guillotine, a falling weight doing the work of the hydraulic ram of the ordinary press.

According to the invention, the moldable material is placed in a die, the air is removed to a large extent from between the particles thereof by means of a low pressure, and then the material is subjected to a sudden high impact to compress the material into a firm and solid article.

Inserts Imbedded

According to another phase of the invention, a stem or the like is carried by the apparatus and firmly embedded in the article during the formation thereof.

A machine embodying the invention and an article made in accordance therewith are shown in the accompanying drawing in which the views are as follows:

Fig. 1 is an elevation of the machine, partly in section and showing divided material in the mold ready to be compressed;

Fig. 2 is a vertical section through the mold showing a finished article therein; and

Fig. 3 is a perspective view of a finished article.

The article shown is an operating knob for rheostats and the like, but the invention is not limited to the manufacture of such knobs nor to the specific machine for making the same.

The machine 1 has a mold 2 into which a die 3 is driven by a weight or hammer 4 arranged between guides 5 which form the sides of the machine.

The mold 2 and the die 3 are adapted to form a frusto-conical rheostat knob 6 which has corrugations 7 formed in its periphery and a stem 8 embedded in its center and extending therefrom.

The stem 8 has threads 9 formed upon its outer end to engage corresponding threads in a rheostat and vary a pressure upon the resistor thereof as the knob 6 is turned.

The base of the machine supports an anvil 10 which has a clamping ring 11 bolted thereto for securing the mold 2 in position.

The clamping ring 11 surrounds the mold 2 and has a tapered inner surface which is complementary to the tapered outer surface of the mold 2.

The bottom of the mold 2 is closed by a plunger 12 having its lower part reduced in diameter to provide a shoulder 13 which normally rests upon a support 14 carried by the anvil 10 and supporting the mold 2.

When the clamping bolts are tightened, the clamping ring 11 is drawn toward the anvil 10 and fixes the mold 2 firmly in position upon the support 14 and the support 14 firmly in position upon the anvil 10.

The reduced part 15 of the plunger 12 extends downwardly through the anvil 10 and is

FIG. 1.

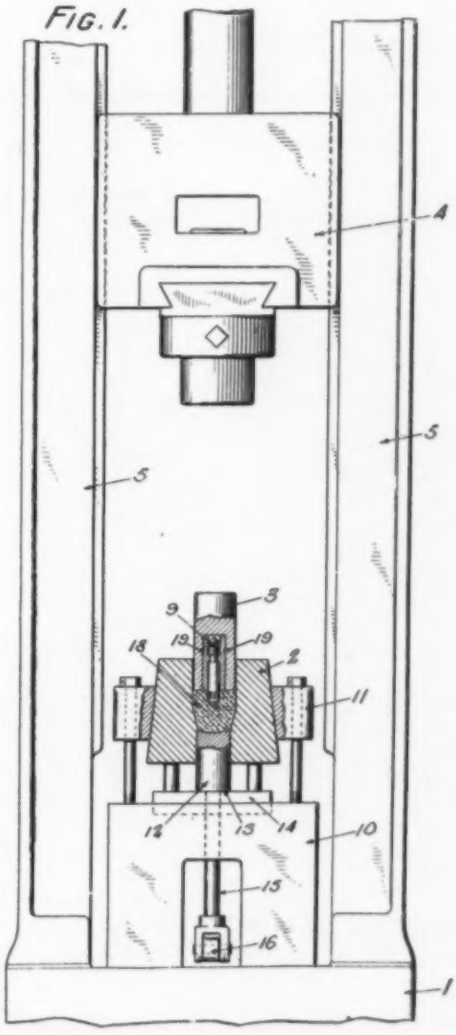


FIG. 2.

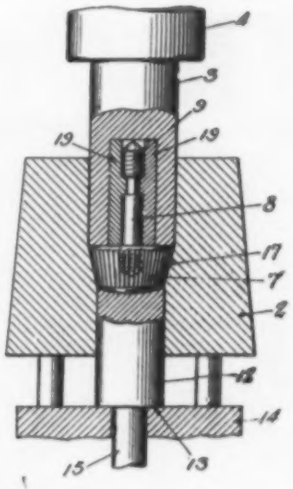
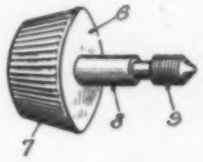


FIG. 3.



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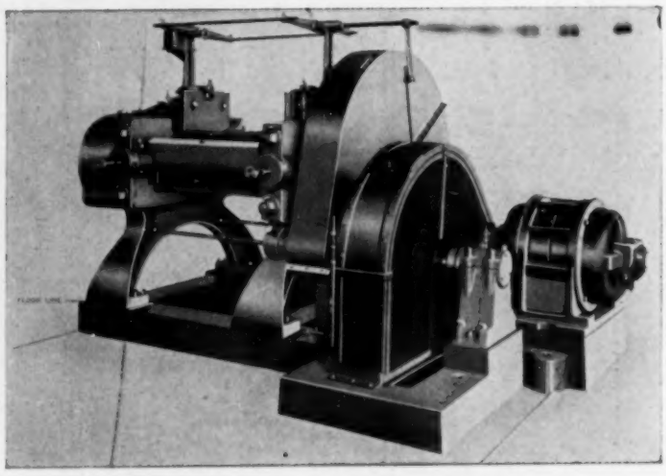

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connected to a crank 16 which may be operated to eject the finished article from the mold 2.

The mold adjacent the plunger 12, tapers upwardly slightly for a distance equal to the thickness of the knob and is provided with flutes or grooves 17, corresponding to the corurgations 7 of the knob.

From the top of the grooves or flutes 17, the wall of the mold extends vertically upward to provide a guideway for the die 3.

The die 3 through which the blow of the hammer is applied to the material is cylindrical and has a recess in the lower end thereof within which the stem 8 of the knob is clamped by a pair of semi-cylindrical shells 19.

The manner in which the knob 6 is formed is as follows:

The weight 4 is raised in any suitable manner and held suspended over the mold 2 while a charge 18 of divided material is placed into said mold. The stem 8 is then inserted in the die 3 and the die placed within the mold so that the end of the stem extends into the material to be molded.

The die 3 has considerable mass and the mere dropping of it into the mold will slightly compress the material therein and force out most of the air therefrom.

However, to insure the removal of the air, the material may be tamped slightly with the die 3.

The weight 4 is then released and falls upon the die 3 with great force, applying a high pressure practically instantaneously to the material within the mold and forming it into a firm solid article.

In practice, a hammer capable of delivering a blow of approximately 1,200 foot pounds has been found satisfactory for forming small knobs, but of course the intensity of the blow may be varied with articles of different size and material.

Material which has been found suitable for making articles such as above described

is composed of pitch and asbestos, and divided into a powdered or other comminuted form, which may be readily handled and supplied to molds.

Any other suitable composition may be used, it being preferable to use a composition consisting of a filler and a binder which will flow when subjected to the impact of a hammer, so that the composition fills the entire mold and becomes bound together in a solid homogeneous mass.

Mycalex—A New Inorganic Molding Material

(*Continued from page 497*)

manufacture of safety contactor tips for high potential testing equipment. Although in this instance Mycalex tips were more expensive than the tips previously used (originally hard fibre which burned or carbonized and then a steatite compound which broke readily), the life of the Mycalex tips is from four to five times that of tips made from the other materials and consequently an economy results from the use of the more expensive material. Mycalex does not burn or carbonize nor does it break readily, thus eliminating the objections to the hard fibre and steatite tips.

Many Uses Feasible

Other applications of Mycalex might be described but enough have been mentioned to indicate the unique features of the material and the advantages of employing it, especially when designs are modified to take full advantage of its molding characteristics and the unusual properties of the finished material.

Thus again, efforts to utilize industrial waste or scrap have developed a useful product, and although these researches do not often fully attain the original objective, the results frequently and fully justify the time and money expended by the investigators.

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TECHNICAL ABSTRACT SECTION

A Review of Literature and Patents

Composition of Matter and Process for Producing Same. Oscar A. Cherry and Franz Kurath, of Chicago, Illinois, Assignors to Economy Fuse & Manufacturing Company, of Chicago, Illinois. U. S. P.1,800,815; Apr. 14, 1931.

Example: In a flask equipped with a return condenser, 56.8 parts of weight of stearic acid and 18.6 parts by weight of aniline are heated to substantially from 170° to 200° C. for approximately one hour. Water is formed as a result of the reaction between the organic acid and the amine. In order to eliminate the water so formed, it is desirable to so arrange the condenser that the water may escape, but so that any aniline being volatilized, will be returned to the flask. At the end of the heating period, and after some cooling, 19 parts by weight of furfural are added and the whole is heated to about 200° C. for approximately one-half hour. At this temperature the product is a thin liquid, which, upon cooling, solidifies to a waxy, dark brown solid at room temperature. The product so formed is a substitute for natural waxes and is found suitable to replace them in many of their applications, and is especially valuable for use in phenolic condensation products, particularly hot molding compositions made from potentially reactive phenolic condensation products.

The product formed in accordance with the above process is found, when used with hot molding compositions as above referred to, to have a threefold function. The waxy product first serves to lubricate the composition in such a manner as to prevent sticking of the composition to the steel molds in which these compositions are ordinarily molded. This is a decidedly valuable property especially in connection with certain compositions made in part from furfural, which compositions have a tendency to stick to the mold during hot pressing operations. The above product secondly serves to plasticize the phenolic hot molding compositions, causing the materials to flow more readily during the molding operations; and thirdly, they serve in such compositions to darken to some extent the final product.

Process of Making Organic Esters of Cellulose Containing Acyl Groups Having More Than Two Carbon Atoms. Hans T. Clarke and Carl J. Malm, of Rochester, New York, Assignors to Eastman Kodak Company, of Rochester, New York. U. S. P. 1,800,860; Apr. 14. 1931.

A process of making organic esters of cellulose which comprises treating cellulosic material with at least an equal amount of an acid selected from the group which consists of propionic, butyric, lauric, myristic, palmitic and stearic acids, and a lower fatty acid anhydride containing less than 10 carbon atoms which impels the esterification of said cellulosic material by acyl groups from said acid, and a common acid solvent of the selected acid, the anhydride and the organic ester produced thereby, the acid corresponding to said anhydride containing less carbon atoms than said selected acid.

Example 1. 25 parts by weight of commercial stearic acid (containing about equal quantities of stearic and palmitic acids) are mixed with 15 parts by weight of acetic anhydrid, 40 parts by weight of chloracetic acid and .05 parts by weight of magnesium perchlorate. Into this mixture 5 parts by weight of bleached cotton tissue paper are thoroughly mixed and the reaction carried out at 60° to 65° C. until a clear dope results, usually after about 5 hours. The product is isolated by pouring into methyl alcohol and washing with warm methyl alcohol. It is acetone-soluble and about 7% of its weight is due to the higher acyl groups in it,—namely, stearyl and palmityl. It is an aceto-palmito-stearate of cellulose.

Composite Laminated Product. Waldo L. Semon, of Cuyahoga Falls, Ohio, assignor to The B. F. Goodrich Company, of New York, N. Y. U. S. P. 1,802,985; Apr. 28, 1931.

To adhere celluloid to rubber

Example 1.—A close-woven fabric is moistened with acetone and rolled firmly into the surface of a sheet of celluloid. The exposed face of the fabric is coated with an air-curing rubber cement, which is allowed to dry, and a sheet of vulcanized rubber, also coated with cement, is applied with a slight pressure. After the lapse of sufficient time to insure the complete cure of the rubber cement, the celluloid and rubber are found to adhere firmly to the fabric.

To adhere celluloid to ebonite, metal, wood, etc.

Example 5.—Apply a fabric to a celluloid surface as in Example 1, and apply to the exposed surface thereof an alcoholic solution of shellac. The ebonite or other material is also coated with shellac, and the surfaces brought together under pressure when the shellac is almost dry.

Example 6.—A metal, wood or other similar surface is covered with glue and a sheet of paper applied thereto. When the glue has set, the exposed surface of the paper is coated with an adhesive solution of a cellulose ester, to which is applied a sheet of celluloid.

Plastic From Natural Resin, Phenol, Aldehyde and Alkali. Isadore Sidney Mellanoff, of Philadelphia, Pennsylvania, assignor to Kemikal, Inc. U. S. P. 1,804,379; May 5, 1931.

A soluble, fusible transparent plastic substance formed by reacting about two parts of rosin, about twenty parts of aldehyde, about twenty parts of phenol and about two parts of alkali at a temperature of about 70° C. which on further heating becomes insoluble and infusible while remaining transparent.

A process of producing a plastic substance comprising treating natural resin with ammonium hydroxide and reacting about two parts of the resultant mass with about twenty parts of phenol, twenty parts of aldehyde and two parts of alkali.

Nitrocellulose Composition. John Hall Gardner, of College Park, Maryland. U. S. P. 1,804,503; May 12, 1931.

A pyroxylin lacquer, for example, may be prepared of the following composition: Nitrocellulose (containing about 12% by weight of nitrogen), 8 oz.; phenoxy ethyl acetate, 2 oz.; and one gallon of volatile organic liquids which may well consist of ethyl acetate 20% by volume, ethyl alcohol 10%, butyl acetate 40%, and benzene 30%. Resins stabilizers, pigments, and plasticizers may or may not be used, the choice depending on the purpose for which the lacquer is intended.

The proportions of the above ingredients may be varied over a wide range without departing from the spirit of the invention. The use of a higher proportion of the phenoxy ethyl acetate increases the softness of the film remaining after the evaporation of the usual, more readily volatile liquids. Phenoxy ethyl acetate itself is substantially non-volatile at ordinary temperatures. Conversely, the use of a smaller proportion of phenoxy ethyl acetate favors the production of a hard residual film.

Treatment of Aldehyde-Amines. Sherman I. Strickhouser, of Passaic, New Jersey, assignor to the Naugatuck Chemical Company, of Naugatuck, Connecticut. U. S. P. 1,805,194; May 12, 1931.

This invention relates to a method of treating aldehyde-amine condensation products and particularly those that are liable to deterioration. It also relates to the products thereof.

Accordingly the invention comprises treating aldehyde-amine condensation products that are liable to deterioration when in contact with air, with a small amount of a poly hydroxy or substituted poly hydroxy aromatic body. The condensation product when so treated may be treated alone or where mixed with other substances. Notably these

condensation products suffer deterioration where they are compounded with such as rubber as in the form of a master batch that awaits further treatment, and the invention provides a class of materials which will check or retard such deterioration. Typical of such materials are catechol, resorcinol, pyrogallol, chlorohydroquinone, dichloro-hydroquinone, dinitroso-resorcinol, hydroquinone. Deterioration of the aldehyde-amine condensation products is manifest particularly where they are in contact with air. Whether the deterioration is caused by true oxidation or merely reformation of, or additions in, the condensation product is not definitely known, but the property of aldehyde-amines, of absorbing iodine provides a means of measuring the deterioration.

Hardened Artificial Mass and Process of Preparing It. Arthur Voss, of Frankfort-on - the - Main - Hochst, Germany, assignor to I. G. Farbenindustrie A. G. of Frankfort-on-the-Main, Germany, U. S. P. 1,805,385; May 12, 1931.

120 parts of the artificial resin obtainable by reaction between 140 parts of formaldehyde of 30 per cent strength and 110 parts of commercial cresol in the presence of an alkali, are dissolved in 250 parts of concentrated caustic soda solution (42° Bé.) and 260 parts of water. Into the clear, somewhat viscous solution 90 parts of chloracetic acid are introduced slowly in portions at a temperature between 50° C. and 60° C. The introduction of each portion causes spontaneous evolution of heat and in order to avoid frothing the temperature is controlled so that it does not exceed 80° C. When all the chloracetic acid has been introduced, the temperature is maintained for about 20 minutes at 100° C. to 102° C. The clear solution is diluted with several times its volume of water and the resin-carboxylic acid thus obtained is precipitated by the addition of hydrochloric acid until the mass is acid in reaction. The resin acid is freed by washing from salt and other inorganic bodies. The paste so obtained is introduced whilst still moist into an aqueous solution of ammonia at a moderately raised temperature, preferably about 60° C.-65° C. The strength and quantity of the solution are such that the quantity of ammonia used is equivalent to that of the resin acid, and amounts to about 17 parts of NH_3; a smaller quantity of ammonia is however sufficient for obtaining a clear solution, which by reason of the presence of free carboxylic acid has an acid reaction. The acid or neutral solution may be used directly as such or it may be concentrated or diluted in any desired degree. It may be used for impregnating paper-pulp, or animal or vegetable tissues; it is also suitable for preparing lacquers because the solution is easily applied to surfaces and yields on drying a smooth lustrous film, which when heated to about 150° C. becomes infusible and insoluble. In order to obtain the

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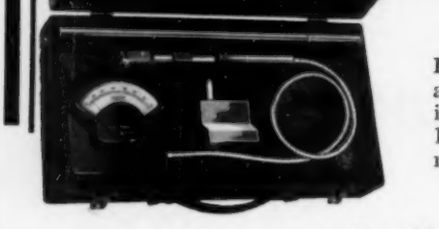

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product in an anhydrous solid state it is sufficient to evaporate the solution advantageously in a vacuum for the purpose of avoiding overheating. The anhydrous product is a dry powder which likewise becomes insoluble and infusible, with separation of ammonia and water vapour when heated to a temperature above 100° C. It is easily soluble in water and has, as compared with the artificial resin known as "Bakelite" the advantage that for the preparation of solutions the use of relatively expensive organic solvents may be avoided.

Phthalic Anhydride-Glycerine Resin and Processes of Making the Same. Lester V. Adams, of Schenectady, New York, assignor to General Electric Company. U. S. P. 1,805,473; May 19, 1931.

The following specific examples are illustrative of my invention:

Example 1.—In the preparation of a resin from phthalic anhydride and glycerine, cobalt linoleate may be introduced to improve the toughness and shock-resistance of the resin. Only a few per cent of cobalt linoleate is required. An improved resin can be prepared by heating the following ingredients by weight in a container to about 200° C. while continually agitating the mixture:

	Parts
Phthalic anhydride	68.8
Glycerine	28.3
Cobalt linoleate	2.9

The resin, as is usual, is first produced in the fusible, soluble condition and is converted to the infusible, insoluble state by heating. In place of phthalic anhydride an equal quantity of succinic anhydride may be employed in order to make a still tougher resin. The succinic anhydride may be first melted and the cobalt linoleate then may be added to the melt. When complete solution or blending of the ingredients has taken place, the glycerine or other alcoholic constituent is added and the reaction is completed. Lead oleate may be used in the manufacture of an alkyd resin in similar proportions and will produce similar results.

Molded Shuttle and Method of Manufacture. Paul W. Hills, of Auburn, New York, assignor to Allen and Hills, Inc., of Auburn, New York. U. S. P. 1,805,090; May 12, 1931.

The method of manufacturing a shuttle comprising forming side members of a material which has been made by placing moldable material and fabric in laminated relation and subjecting the same to heat and pressure, placing such side members in a shuttle mold, filling the remainder of the mold with a moldable material of the same properties as that used in making the material for the side members, portions of such moldable material being in physical contact with the ends of the side members, and subjecting the contents of the mold to heat and pressure.

Mold For Toilet Seats. George Johnson, of Muskegon, Michigan, as-

signor to the Brunswick-Balke-Collender Company, of Chicago, Illinois. U. S. P. 1,805,871; May 19, 1931.

There is a wide variation in the distances at which the lugs of toilet seats are spaced apart and heretofore it has been necessary in forming the plastic material to provide a large number of different molds to correspond to the different spacings of the hinge lugs. With this invention it is unnecessary to have this large number of molds, as the variation in the spacing between the hinge lugs is provided for by the adjustability of the small molds which may be quickly and conveniently adjusted in position, as is apparent.

In a device for molding a coating of plastic composition about a toilet seat core having projecting hinge lugs, the combination of a large mold for one side of the core, having a recess therein, a pair of small molds for one side of the hinge lugs, fitting in said recess and being spaced apart, a spacer block in said recess between said small molds, and a pair of spacer blocks, each fitting in said recess and disposed outwardly with respect to said small molds to define the position thereof, all of said spacer blocks being removable to permit adjustment of the position of said small molds to correspond to the position of the hinge lugs; and complementary molding means for the other side of said core and said hinge lugs.

Vinyl Ester Composition. Harry B. Dykstra and Walter E. Lawson, of Wilmington, Delaware, assignors to E. I. Du Pont de Nemours & Company, of Wilmington, Delaware. U. S. P. 1,806,152; May 19, 1931.

Vinyl ester polymers and vinyl chloride polymers, in particular, have been used in coating compositions with the addition of certain materials as softeners therefor. We have discovered that the materials previously employed as softeners, such as camphor, chlorinated hydrocarbons, chlornaphthalene, phenophosphates, naphtholphosphates and cresolphosphates produce films which do not remain soft and flexible, but become brittle within a very short time, such as one or two weeks.

We have found that ethers of polyalcohols, such as dibenzylin and tribenzylin, which are the dibenzyl and tribenzyl ethers of glycerin, are valuable softening compounds. Dibenzylin is a water white liquid, practically odorless, and boils at 195 to 200° C. under 6 mm. pressure.

Example 1

Add 1 part of dibenzylin to a solution of 3 parts of the alpha polymer of vinyl chloride in 20 parts of a solvent composed of 80 per cent ethyl acetate and 20 per cent butyl acetate. The solution is permitted to flow out on a glass plate, and the solvents allowed to evaporate, producing a film of exceptional softness and flexibility.

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Fig. 1

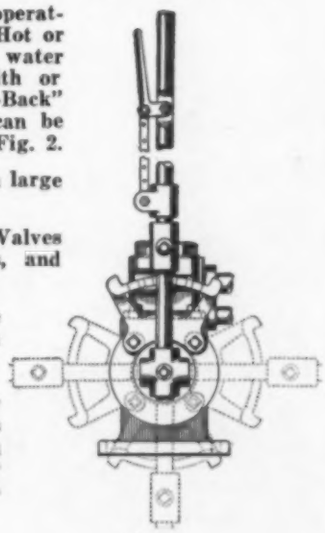

Fig. 2

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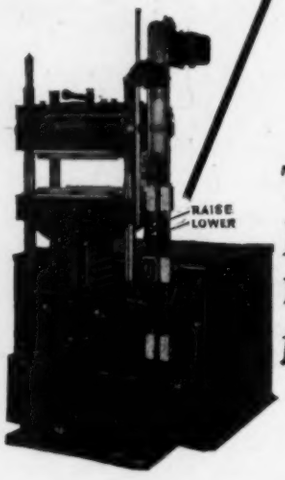

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Example 2

Add 10 parts by weight of the alpha polymer of vinyl chloride to 3 parts by weight of tribenzylin in 87 parts of a solvent composed of 50% ethyl acetate and 50% butyl acetate. A clear, tough and exceptionally flexible film is secured from this mixture.

Process for Production of Substance Having a Nacreous Aspect. Jean Paisseau, of Paris, France. U. S. P. 1,806,863; May 26, 1931.

Process for the production of sheets of plastic material having a nacreous and chatoyant aspect, the nacreous appearance of which presents a predetermined design, which process consists in utilizing elementary sheets of plastic material in which embedded brilliant particles have all been oriented parallel to the surface, in imparting to the brilliant particles of the said sheets a varied orientation by the action of a die applied upon the sheets when they are in a substantially soft condition, the projecting portions of the die corresponding to the design to be obtained and entering the thickness of the sheet, in cutting the sheets thus treated or distorted to make them correspond in size to the cross-sectional area of the chamber of a block-press, in stacking up the pieces or sheets thus cut upon each other in the said press, in uniting them into a compact block in the said press according to standard practice, and in cutting or slicing the block into sheets of the desired thickness.

Condensation Product of Ketonic Acids. Herman Alexander Bruson, of Germantown, Pennsylvania, assignor to Rohm & Haas Co., Inc., of Philadelphia, Pennsylvania. U. S. P. 1,807,503; May 26, 1931.

Example 1

The following mixture is placed in a suitable kettle equipped with an agitator and heated as rapidly as possible to 240-250° C.

135 gr. benzophenone-2,4′-dicarboxylic acid (melting point 235° C.)
46 gr. glycerol
149 gr. fatty acids obtained from hydrolysis of raw linseed oil

The mixture is heated for about 4 hours at 240-250° centigrade preferably in an inert atmosphere such as nitrogen or carbon dioxide to prevent oxidation. A reddish mass is obtained forming a very tough, plastic resin readily soluble in toluene, butyl acetate and acetone.

Example 2

135 gr. benzophenone-2,4′-dicarboxylic acid
46 gr. glycerol
120 gr. fatty acids obtained from hydrolysis of raw linseed oil

are heated together at 240-250° C. for 3½ to 4 hours. Product is tougher than that obtained in Example 1. It is soluble in butyl acetate, toluene, and acetone.

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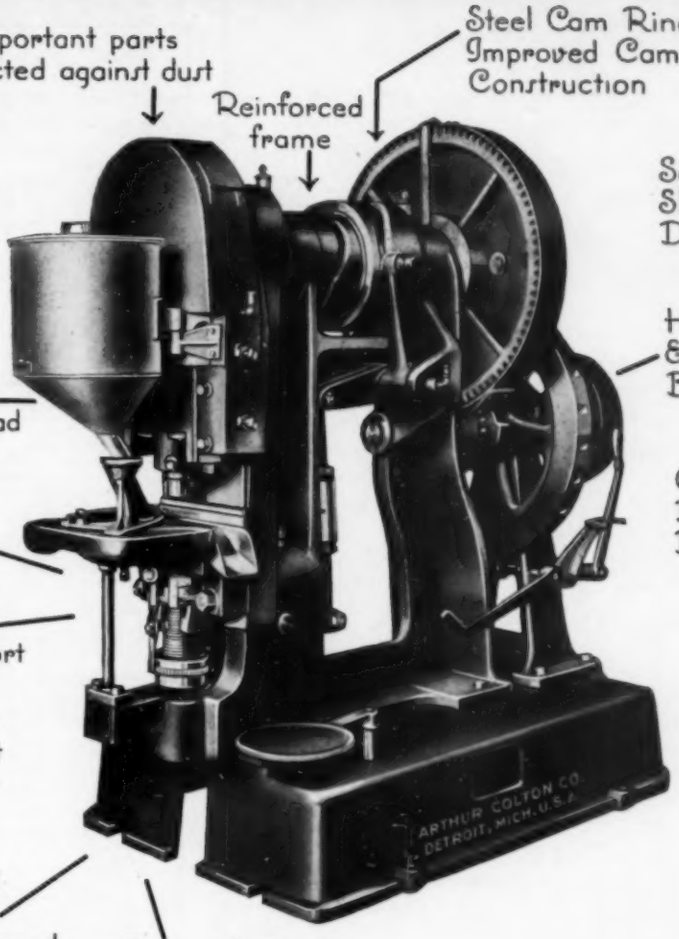
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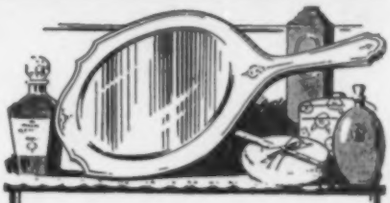

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And Now, In Closing:

WE bow in thanks for the kind words received . . . . since our mention of "Five-and-Ten" items earned most of the applause, we present some more observations on the same . . . . Perfume and cosmetic containers lead the Woolworth plastic market . . . . among the new arrivals is a urea closure for Priere's "Sweet Pea" . . . Loveland's Cleansing Cream has a solid blue closure and the Peggy Lloyd Cream jar is topped with a beautiful rippled black screw-cap . . . . in the Electrical Department are two new Plaskon items; three-way outlets and connector plugs, both in an ivory finish . . . . Woolworth is also stocking the milk bottle opener and cap molded by Alden . . . . Gadgets of all kinds are sales-leaders the country over, with lighters and trick ash receivers doing a good business . . . . In this period of continued vacations, there is little personal news . . . . we can report, however, that President Harry Dent of Durez has written a squib for the September issue of the Executive Service Bulletin, Metropolitan Life Insurance Company . . . . it is not off the press yet; rumor has it that a Mr. Coolidge is reading the proof . . . . Charles E. Slaughter of Unyte, who was one of our speakers at the Chemical Exposition, has written a new children's book on India — "Golden Tusk" . . . . his first was "Hahtibee, the Elephant", and both are published by Alfred A. Knopf . . . . a colorfully entertaining story . . . . Dr. Pelikan, formerly of Celluloid, whose writings are familiar to our readers, is still surveying, at first hand, the European industry . . . . Durium is now in the hands of Erwin, Wasey and Company, Metropolitan advertising agents . . . Plastics & Molded Products is mentioned thirty-two times in the August Chem. & Met; . . . . Well, Well! . . . . The tulips advertised on page 526 are not molded . . . . some plasticians, on the other hand, might be better off with only onelip! . . . .

A letter from our friend G. C. Wilson of Norton Laboratories brings us a delightful quotation from Elbert Hubbard's writings:—

"The typical buyer is a man past middle life, spare, wrinkled, intelligent, cold, passive, non-committal; with eyes like a codfish, polite in contact, but at the same time unresponsive, cool, calm and as damnably composed as a concrete post or a plaster-of-paris cast; a human petrification with a heart of feldspar and without charm or the friendly germ, minus bowels, passions, or a sense of humor. Happily they never reproduce, and all of them finally go to hell."

THE food industries, in spite of a decline in commody prices, have maintained a fair balance between production and demand. As "Food Industries" states in its August issue:

"The lure of bargain prices must ultimately win the contest with fear, but it should be remembered that financial statements showing reasonable profits will do much more to restore public confidence than statements of loss. Profits cannot be made by doing business at a loss. Therefore, if business recovery is to take place management must learn how to make a profit today."

DO we need to explain the essential difference between notoriety and publicity? Many otherwise intelligent business executives are using the two interchangeably, and, as we intimated in our August Editorial a few in this industry are fostering only the first of these, sometimes under the guise of the second. Occasionally, with the big industries, publicity by an outside or a government agency results in notoriety. This has been the case with the automobile and electrical industries in agitation over unemployment, and we all know that the U. S. Steel salary reductions accomplished the same end. In this much smaller industrial pinwheel, however, adverse reports, as well as favorable ones, may be traced directly to individuals within the industry itself. Overprediction and underprediction, under the guise of "writing for the press," should be stopped. It is not true or intelligent publicity.

THIS is the time, at the turn of the business trend, for some courageous action on the part of fabricator, molder and supplier. Through the all-too-long period of adversity a certain kind of business courage has prevailed. But it has not taken the form of a fighting departure from the usual competitive back-washing. In all of our talks, that handy word, price, has been divorced from quality by the judge of profit. The result is loss. Idle machinery is not so much a problem as idle brain power, and competition was never a grave question when raised above the price standard. Existing business may not take care of itself, but new business most certainly won't. Too many of us forget that we are competing not only with others in this industry but with the other types of materials. And these other materials —metal, wood, china and rubber —are going after new markets with a great deal of that courage we mention above. Isn't it time that this industry did the same thing?